Xcel Energy℠

February 14, 2008

Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101

- VIA ELECTRONIC FILING -

RE: PETITION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION FOR A CERTIFICATE OF NEED FOR THE MONTICELLO NUCLEAR GENERATING PLANT FOR EXTENDED POWER UPRATE
DOCKET NO. E002/CN-08-____

Dear Dr. Haar:

Northern States Power Company, a Minnesota corporation ("Xcel", "Company") is pleased to submit to the Minnesota Public Utilities Commission ("Commission") for consideration this Application for a Certificate of Need for the Monticello Nuclear Generating Plant for Extended Power Uprate. Commission approval will allow us to increase the electrical generating capabilities of the north-central Minnesota plant by 71 MW (from a nominal capacity of 585 MW to a nominal capacity of 656 MW) to meet our customers' growing energy needs. The Certificate of Need application is submitted pursuant to Minn. Stat. § 216BC.243 and Minn. R. 7849 and demonstrates that the Monticello uprate project is the most cost-effective option available, provides significant environmental benefits as a non-carbon emitting resource, and reduces fossil fuel price risk and the risk of future environmental regulations by adding to our fuel diversity.

The increased capacity will be achieved by increasing the steam produced in the reactor and via changes to the balance-of-plant systems that convert the steam to electricity. The project will require very few modifications to the reactor and its support systems that produce steam; however the project will require a number of modifications to the systems that convert the steam to electricity. A license amendment to the Monticello operating license addressing the safe operation at the higher thermal power level will be submitted to the Nuclear Regulatory Commission approximately April 2008. The NRC will review and is expected to approve an amendment to the existing operating license to increase the thermal power level of the reactor.

The Commission's July 28, 2007 Order in Docket E002/RP-04-1752 (2004 Resource Plan) required the Company to pursue the necessary regulatory approvals for the Monticello uprate project. The Commission's September 28, 2007 Order in the same docket granted a delay of the filings until at least December 14, 2007. The delay was granted based on our request to reassess the impacts of the state's Next Generation Energy Act of 2007. On December 14, 2007 we filed our 2007 Resource Plan (Docket No. E002/RP-07-1572), which indicated that even after including the demand-side management and renewable requirements of 2007 legislation, we are projecting a deficit starting in 2010. We submit this application as one element of our plan to address that deficit.

The Company intends to file the accompanying Site Permit Application for the Monticello project uprate towards the end of second quarter 2008.

Note that we are sending our initial fee payment of $3,388 as provided for in Minnesota Rules 7849.0210 subp.1 to your attention under separate cover.

We are providing hard copies of this filing to the Office of the Attorney General and a filing summary to other parties on the attached service lists. Copies of our Application can be obtained from the Xcel Energy web site at www.xcelenergy.com.

Please contact Brian Zelenak at brian.r.zelenak@xcelenergy.com or (612) 330-5641 if you have any questions regarding this filing.

SINCERELY,

Scott Wilensky

SCOTT M. WILENSKY
ACTING VICE PRESIDENT
GOVERNMENT AND REGULATORY AFFAIRS

Enclosures

c: Service Lists

CERTIFICATE OF SERVICE

I, Edward Morgan, hereby certify that I have this day served copies of the foregoing document or a summary thereof on the attached lists of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States Mail at Minneapolis, Minnesota

xx electronic filing

DOCKET NO. E002/CN-08_____

Distributed to:

- In the Matter of Xcel Energy's 2008-2022 Integrated Resource Plan Service List (Docket No. E002/RP-07-1572)
- Xcel Energy's Miscellaneous Electric Service List
- In the Matter of Xcel Energy's Application for Authority to Increase Rates for Electric Service (Docket No. E002/GR-05-1428)
- In the Matter of Xcel Energy's Application for a Certificate of Need to Establish an Independent Spent Fuel Storage (Docket No. E002/CN-05-123)

Dated this 14th day of February 2008

/s/

_____

In the Matter of Xcel Energy's 2008-2022
Integrated Resource Plan

E002/RP-07-1572 02-01-2008

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In the Matter of Xcel Energy's Application for Authority to Increase Rates for Electric Service

Official OAH Docket No. 3-2500-17033-2
PUC Docket E002/GR-05-1428 11-29-07

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In the Matter of Xcel Energy's Application
for a Certificate of Need to Establish an
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E002/CN-05-123 01-22-2008

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PETITION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION FOR A CERTIFICATE OF NEED FOR THE MONTICELLO NUCLEAR GENERATING PLANT FOR EXTENDED POWER UPRATE

DOCKET NO. E002/CN-08-___

FEBRUARY 14, 2008

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

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David Boyd	Commissioner
Thomas Pugh	Commissioner
Phyllis Reha	Commissioner
J. Dennis O'Brien	Commissioner

IN THE MATTER OF THE PETITION OF NORTHERN STATES POWER COMPANY, A MINNESOTA CORPORATION, FOR A CERTIFICATE OF NEED FOR THE MONTICELLO NUCLEAR GENERATING PLANT FOR EXTENDED POWER UPRATE	DOCKET NO. E002/CN-08-___ **APPLICATION FOR CERTIFICATE OF NEED**

SUMMARY OF FILING

Please take notice that on February 14, 2008, Northern States Power Company, a Minnesota corporation ("Xcel Energy" or "the Company"), filed with the Minnesota Public Utilities Commission ("Commission") an Application for a Certificate of Need to increase the electrical generating capabilities of the Monticello Nuclear Generating Plant in north-central Minnesota by 71 MW. The increased capacity will be achieved by increasing the steam produced in the reactor and changes to the balance-of-plant systems that convert the steam to electricity. The project will require very few modifications to the reactor and its support systems that produce steam; however the project will require a number of modifications to the systems that convert the steam to electricity.

The Commission's July 28, 2007 Order in Docket E-002/RP-04-1752 (2004 Resource Plan) required the Company to pursue the necessary regulatory approvals for the extended power uprate project at the Monticello Nuclear Generating Plant. Ordering Paragraph 1c of the Commission's September 28, 2007 Order in the same docket granted a delay of the filings until at least December 14, 2007. The delay was granted based on our request to reassess the impacts of the Next Generation Energy Act of 2007.

On December 14, 2007 we filed our 2007 Resource Plan, which indicated that even after including the DSM and renewable requirements of the 2007 legislation, we are projecting a capacity deficit starting in 2010. Our analysis indicates that the implementation of the Monticello project provides both significant environmental and

financial benefits to our customers over the planning horizon. Implementation of the Monticello project is between $129 million and $514 million less expensive than the alternatives considered and *reduces* carbon emissions by expanding a non-carbon emitting plant and displacing energy from existing carbon producing plants.

Copies of the Application can be obtained from the Xcel Energy web site at www.xcelenergy.com.

Application for a Certificate of Need for the Monticello Nuclear Generating Plant

Table of Contents

1 Summary

1.1 Introduction

Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company"), submits this Application for a Certificate of Need to the Minnesota Public Utilities Commission to increase the electrical generating capacity at our Monticello Nuclear Generating Plant, by 71[1] MW. The power uprate project is necessary to meet our customers' growing energy needs. The Monticello power uprate project:

- *Is the most cost-effective option available to meet our customers' growing needs.* The project is $169 million less expensive than the next best alternative on a present value revenue requirements basis ("PVRR"). The sensitivity analysis confirms the project is superior to the alternatives under a wide spectrum of assumptions. The project is at least $80 million less expensive than any of the sensitivities performed.

- *Provides significant environmental benefits.* Because Monticello is a non-carbon emitting resource, expansion of Monticello will increase capacity without increasing carbon emissions - in fact, expansion of Monticello will result in carbon *reductions* by displacing the carbon being produced by existing fossil fuel plants.

- *Provides a hedge to future risks and costs by reducing our exposure to fossil-fuel prices and future environmental regulations.* The project adds to our fuel diversity by acting as a fuel price hedge against future natural gas prices and carbon regulations.

[1] The estimated average monthly gain is calculated to be 71 MW; however the actual amount will vary by month and could be slightly more or less.

Due to the importance of Monticello as a base load resource and the nature of refueling outages at nuclear plants, this project must be completed during the 2009 and 2011 refueling outages for the additional 71 MW to be available when needed. Failure to implement over the next two refueling outages will lead to a less cost-effective project and higher carbon emissions until implemented.

Since the project will increase the generating capacity of the plant by more than 50 MW, pursuant to Minn. Stat. § 216BC.243 and Minn. R. 7849, Northern States Power Company, a Minnesota corporation, does hereby make application to the Minnesota Public Utilities Commission ("Commission") for a Certificate of Need ("CON") authorizing an uprate to the Monticello plant to increase the electrical generating capacity from a nominal capacity of 585 MW to a nominal capacity of 656 MW.

1.1.1 Structure of Application

We present our Applications in the chapters listed below, including chapters specifically addressing each of the four principle criteria provided by the Commission's Certificate of Need rules (Minn. Rule 7849.0120):

- *Summary,* providing an overview of the Application, the project, the need for the project and the benefits of the project.

- *General Information and Regulatory Permits*, where we provide general information required of a CON applicant and a discussion of the other permits necessary to implement the project.

- *Project Description,* which provides a detailed description of the project and the necessary changes to the existing plant.

- *Project Environmental Information,* which discusses the environmental impacts of the project.

- *Denial Would Adversely Affect Adequacy, Reliability, and Efficiency of Energy Supply System*, providing verification of our system needs for the additional energy and capacity provided by this Proposal.

- *An Examination of Alternatives,* where we demonstrate that our Proposal is the most reasonable and prudent alternative available to meeting our customers' growing needs.

- *Project Benefits Society,* presenting additional considerations such as environmental impacts and risk mitigation that will benefit society, if our Proposal were adopted.

- *Project Complies with Rules, Policies and Regulations,* demonstrating that our Proposal complies with all applicable requirements.

1.2 Background

The effects of the Next Generation Energy Act of 2007, as described in our 2007 Resource Plan, have significantly transformed our future resource needs. The aggressive new energy conservation goal of 1.5 percent of retail electric sales, the requirement of 30 percent renewable energy by 2025, and the requirement to reduce greenhouse gas emissions by 15 percent below 2005 levels have combined to recast the nature of how the Company must plan to meet future energy needs. Despite these significant changes, however, power uprate at Monticello continues to prove cost-effective and offer an important, carbon-free resource for meeting our customers' growing needs.

In this section, we present background on both the new legislative requirements and their effects on our customers' needs, and the Monticello plant and its role on our overall system.

1.2.1 Need Background

In our 2004 Resource Plan, the Commission approved our request to pursue a package of uprates - including the Monticello project - as part of an effort to meet an identified base load need (energy and capacity) projected in the 2004 Resource Plan. Following the passage of the major energy policy initiatives of the 2007 legislative session, the Commission granted the Company's request to defer implementation of the Monticello project (and others) pending the re-evaluation of future needs in an expedited 2007 Resource Plan.

As demonstrated in our 2007 Resource Plan filed on December 14, 2007, even after planned implementation of the 2007 legislative energy initiatives, our energy and capacity needs continue to grow at over 1 percent per year. This continued growth creates a 126 MW capacity deficit starting in 2010 that ultimately grows to over 2,800 MW by 2022.

Incorporation of the Renewable Energy Standard ("RES") adds a significant amount of wind energy to our system, but it does not add the needed capacity to our system needs. The addition of the Monticello power uprate project is the most cost-effective and the most emission friendly resource available to add the needed capacity.

1.2.2 Plant Background

Monticello began operation in 1970. In 2007, the Nuclear Regulatory Commission ("NRC") approved Monticello's operating license through 2030. The plant is a critical part of our ability to meet our customers' ongoing energy needs and will continue to be a valuable energy resource available to our customers for many years to come. Monticello is one of our most reliable generation resources: it is a safe, non-carbon emitting and economical producer of significant amounts of energy and capacity. Monticello currently produces about ten percent of our Upper Midwest customers' electric energy needs.

Due to the nature and economics of a nuclear power plant, Monticello is operated at full capacity whenever it is available. This results in the equivalent availability factor essentially being the same as the capacity factor (less than a 0.5 percent difference for 2007). From 2002 to 2006, Monticello maintained an average capacity factor of 94.2 percent.

1.3 Project Description

We will achieve the additional 71 MW from Monticello by:

a. Increasing the amount of steam produced in the reactor; and
b. Improving the balance-of-plant equipment that converts the steam into electricity.

Higher steam flow from the reactor is obtained by operating the reactor at a higher thermal power level. We obtain the higher thermal output primarily by increasing the number of new fuel assemblies in the reactor core at each refueling. The increased MW output is accomplished without increasing the operating reactor pressure and without changes to the fuel design or fuel design limits.

The project will result in very few modifications to the reactor and the reactor support systems that produce steam, but the balance–of-plant systems that convert the steam produced in the reactor to electricity will need modifications. Some of the more significant balance-of-plant changes will be the replacement or modifications to the high-pressure and low-pressure turbines; replacement of the condensate demineralizer and a number of condensate pumps and motors; replacement or modification of the steam dryer; replacement of a number of feedwater pump and motors and related equipment.

The Monticello power uprate project will require a license amendment from the NRC to operate the plant at a higher thermal temperature. We are in the process of preparing the operating license amendment and will file it by mid-year 2008.

1.4 Project Benefits

The Monticello project addresses our forecast needs and provides multiple benefits. The project utilizes an existing site and utility infrastructure to provide approximately 71 additional MW of economical and reliable, non-carbon emitting generation capacity and energy. The additional capacity and energy from a non-fossil fuel burning generation facility provides a hedge against the volatility of natural gas prices. The project also provides a hedge against unanticipated delays in meeting the challenges in achieving the conservation goals and delivering the wind power contained in our 2007 Resource Plan.

1.4.1 Financial Benefits

The total project cost for the power uprate will be approximately $104 million. The final cost will depend upon whether a new steam dryer is required.[2] If required, the new steam dryer will add $29 million to the project for a total project cost of $133 million. This results in an installed cost range of between $1,465/kw and $1,873/kw.

The Monticello project is the lowest-cost alternative available. A present value revenue requirements ("PVRR") comparison over the remaining life of the operating license of the plant shows that the project is $169 less expensive than a natural gas combustion turbine and $514 million less expensive than a biomass alternative. Numerous sensitivities confirm the project is least cost. Even assuming the new steam dryer is necessary (plus $29 million) and that natural gas prices are 20 percent lower than forecasted, the uprate project has a PVRR benefit of $80 million over the next alternative.

1.4.2 Environmental Benefits

Monticello is an existing, non-carbon emitting resource; expanding it would *reduce* carbon emissions. The uprate project displaces capacity

[2] Equipment has been installed to assess the need for the new steam dryer. The decision will be made after analyzing data obtained following startup after the 2009 uprate modifications are complete.

and energy from both new and existing carbon emitting resources, contributing to our ability to implement the carbon and fossil fuel reductions required by the 2007 legislature. None of the other alternatives reviewed provide the carbon reduction benefits of the Monticello project.

The project does not increase the existing plant's environmental footprint and the project will be operated within the limits of the existing air and water operating permits. Use of an existing generation site and existing transmission lines will not result in the development of an additional green-field site.

1.4.3 Risk Benefits

Our 2007 Resource Plan indicates that a significant amount of natural gas generation capacity will be necessary to complement the wind energy required by the RES. Increasing the MW from a nuclear resource provides a fuel diversity hedge against future natural gas prices and as a non-carbon emitting resource, the project also provides a hedge against future carbon regulation from fossil-fuel resources. The project also provides a resource hedge against any unanticipated delays in meeting the conservation or RES requirements of the 2007 legislation.

1.5 Certificate of Need Criteria

The procedures and criteria for a Certificate of Need are contained in Minn. Stat. § 216B.243 and in Minn. R. Part 7849 and 7829. Pursuant to the authority granted in Minn. Stat. § 216B.243, subd. 1, the Commission has established criteria to assess the need for a Large Electric Generating Facility ("LEGF") in Minn. R. 7849.0120. A Certificate of Need must be granted to an applicant upon determining that four principle criteria of Minn. R. 7849.0120 are met. They are:

A. *The probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the*

applicant's customers, or to the people of Minnesota and neighboring states…,

B. *A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record…,*

C. *By a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health,*

D. *The record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.*

Our Proposal satisfies these criteria and should be approved, as discussed in the following sections.

1.5.1 More Adequate, Reliable, and Efficient Energy Supply

"The probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply …,"

Our Proposed Project at Monticello fully meets this criteria on all points:

- *Adequacy*: Our updated growth forecast[3] indicates that despite compliance with the new DSM and renewable legislation, our system continues to grow. Our system demand and energy requirements continue to grow at approximately 1 percent per

[3] Appendix B contains an explanation of a change that was made as to how we account for DSM in the forecast versus previous filings.

year,[4] or by 133 MW per year and approximately 556 GWh per year. Our forecast indicates that starting in 2010 we have a 126 MW capacity deficit that increases to over 2,800 MW by 2022.

After estimating our customers' energy and demand requirements, we examine the generating resources available to meet those requirements. Figure 1-1 presents a comparison of our forecast of production capacity requirements compared to existing generation resources and pending generation acquisitions. The load obligation line in Figure 1-1 reflects the legislative adjustment for DSM savings and a 15 percent generation reserve requirement as required by the Mid-Continent Area Power Pool ("MAPP"). Our load obligation for electric power will be approximately 10,700 MW in 2008, 11,700 MW in 2015, and 12,700 MW by 2022. Additional generation is required for us to adequately serve our customer's growing energy needs.

- *Reliability*: Monticello is essential to the reliability of the region's electric energy supply as it provides base load energy and capacity needs 24 hours per day, 7 days per week. Monticello has proven to be a highly reliable plant with an average capacity factor from 2002 through 2006 of 94.2 percent. The project will not affect the current reliability of the plant and the additional capacity and energy will be available at the current level of reliability.

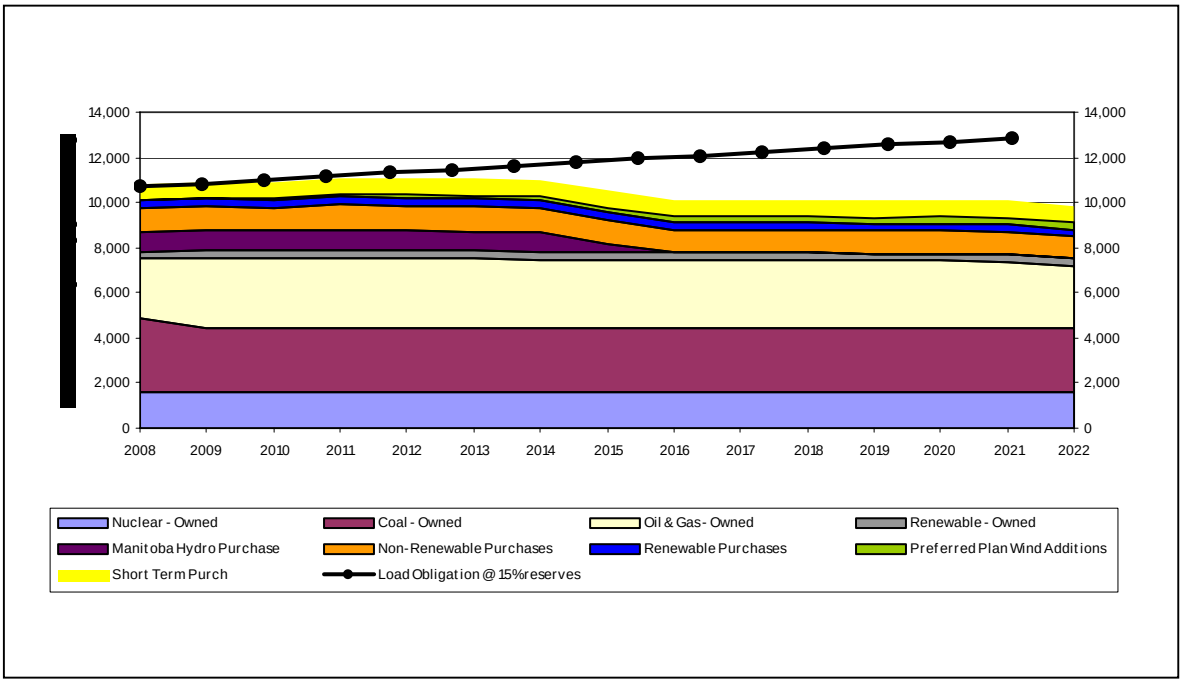
- *Efficiency*: By comparing the need to available generation resources and planned additions (including the addition of approximately 200 MW per year to meet the RES), we gain a better understanding of the appropriate size and timing of new resource needs. Prior to the RES legislation, we clearly had a need for both base load energy and capacity. Our current analysis indicates that while the RES legislation provides a significant amount of energy, we still have a future capacity

[4] 90th percentile peak forecast and 50th percentile energy forecast level

need. We anticipate that the majority of the future capacity need will be filled by new natural gas generation.

The expansion of such a reliable source of base load energy will reduce our use of current intermediate and peaking natural gas plants, which will allow us to use those plants to complement the intermittency of the new wind resources. By expanding an existing base load generation facility, we can use some of the existing natural gas generation (which has more flexibly dispatchability) to complement the new wind resource. The synergies gained are an extremely efficient use of energy supply resources.

Figure 1-1
Resource and Requirements



Denial of our proposal would have an adverse effect on the adequacy, reliability, and efficiency of energy supply for our customers and the region. Our customers' growing needs require us to obtain new resources to adequately meet their needs. The project will not affect Monticello's high reliability and the project will achieve the additional MW from one of our most reliable resources. Efficiencies will be

gained by the use of an existing site versus the development of a new generation resource on a new green-field site and by changes to the dispatching of existing natural gas plants to complement energy from new wind resources.

1.5.2 Best Alternative

"A more reasonable and prudent alternative to the proposed facility has not been demonstrated …,"

The Monticello project offers the best alternative to meet the needs of our customers. The Monticello project is the lowest-cost alternative, provides significant environmental benefits through reduced carbon and other emissions and will assist us in meeting our legislated carbon and reduction goal.

We reached this conclusion after comparing the project to various alternatives (including a coal purchased power agreement ("PPA"), a biomass facility, and a natural gas combustion turbine ("CT")). We performed numerous sensitivities to determine the robustness of our analysis. In all cases, the Monticello project proved to be the most cost-effective and contributed the most to our legislated carbon and fossil-fuel reduction goals. As seen in Table 1-1 below, the coal PPA, biomass alternative, and the natural gas CT alternatives were between $169 million and $514 million more expensive than the Monticello project on a PVRR basis.

Table 1-1
PVRR Analysis

	PVRR (thousands)
Monticello Uprate	$61,674
Natural Gas Combustion Turbine	($169)
Coal PPA	($273)
Biomass	($514)

Our analysis confirms that the alternatives do not offer a more financially or environmentally prudent or reliable resource for our system than Monticello power uprate - demonstrating the Monticello project is the most reasonable and prudent alternative available to best meet our needs.

1.5.3 Benefits Society

"…the proposed facility, … will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health."

The Monticello project provides multiple benefits to our customers and to society. The project serves our customers' growing needs with significantly fewer environmental impacts than the alternatives. Table 1-2 below indicates that the additional MW from the Monticello project will result in significant carbon reductions over the next twenty years as compared to the alternatives. This result stems from the emission-free nuclear resource replacing energy and capacity from existing and future fossil fuel resources.

Table 1-2
Total System Emissions of CO_2

	Increase in CO_2 (Tons)
Monticello Uprate	0
Natural Gas Combustion Turbine	6,376,480
Coal PPA	12,247,950
Biomass	25,090,410

Additionally, since the project is located at an existing site and the footprint of the existing site will not be expanded due to the project, society benefits by not developing a green-field for a new generation resource. The changes necessary to achieve the additional 71 MW of output will primarily take place within the confines of existing buildings. Since the minimal increase in off-site dose and cumulative radiation dose will remain well below the federal regulatory limits, human health will not be negatively affected.

1.5.4 Consistent with Rules and Policies

"…the design, construction, or operation of the proposed facility, … will … comply with relevant policies, rules, and regulations …"

The Monticello nuclear generation facility is a highly regulated generation resource. The project is being designed, implemented, and will be operated in compliance with stringent NRC requirements. The NRC will review the project per their extended power uprate review process and the process review will result in a change to the plant's operating license that will allow us to operate the plant at an increased thermal capacity that will enable us to gain the additional 71 MW.

The Monticello power uprate project is an integral piece of our strategy to meet and advance Minnesota's new energy policies

established by the Next Generation Energy Act of 2007. First, the Monticello project is necessary for Xcel Energy to meet our goal of reducing greenhouse gases by 15 percent below 2005 levels by 2015, as required by Minn. Stat. § 216H.02. Second, the Project will provide the Company the capacity necessary to complement the wind energy required in Minn. Stat. § 216B.1691, subd. 2a(b).

The power uprate project also meets the State's policy favoring non-proliferation of transmission corridors by utilizing an existing generation site to produce additional energy and capacity and existing transmission facilities.[5]

1.6 Project Serves the Public Interest and Satisfies Requirements

As summarized above and further described in this Application, the Monticello uprate project serves the public interest because it satisfies all four prongs of the Commission's Certificate of Need criteria under Minnesota Rules 7849.0120. This Application provides the Commission the information necessary to show the demand for electricity cannot be met by additional conservation and load management activities and provides the information necessary for the Commission to assess the need for the facility per Minn. Stat. § 216B.243.

1.7 Conclusion

The project is the most cost-effective alternative to meet our customers' energy needs under a wide variety of assumptions and provides significant environmental benefits. The project will lead to a reduction in carbon and other emissions and will take place at an existing generation site – potentially eliminating the development of a new Greenfield site. The project also provides a hedge against future

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[5] P*eople for Environmental Enlightenment and Responsibility PEER) v. Minnesota Environmental Quality Board,* 266NW2d858 (Minn. 1978).

[6] P*eople for Environmental Enlightenment and Responsibility PEER) v. Minnesota Environmental Quality Board,* 266NW2d858 (Minn. 1978).

risks and costs by reducing our exposure to fossil-fuel prices and future environmental regulations. This project provides multiple benefits and we are pleased to offer this project for consideration.

2 General Information and Regulatory Permits

Pursuant to Minn. Stat. § 216BC.243 and Minn. R. 7849, Northern States Power Company, a Minnesota corporation, does hereby make application to the Minnesota Public Utilities Commission for a Certificate of Need authorizing an uprate to the Monticello plant to increase the electrical generating capacity by 71 MW from a nominal capacity of 585 MW to a nominal capacity of 656 MW.

This part of our Application provides general information regarding the applicant and the proposed project.

2.1 General Information

The applicant's complete name and address, telephone number, and standard industrial code are:

Northern States Power Company, a Minnesota corporation ("Xcel Energy")
414 Nicollet Mall
Minneapolis, Minnesota 55401
(612) 330-5500
SIC Code: 4911

The official or agent to be contacted regarding the filing is:

Brian R. Zelenak
Manager, Regulatory Administration
414 Nicollet Mall, 7th Floor
Minneapolis, Minnesota 55401
(612) 330-5641
brian.r.zelenak@xcelenergy.com

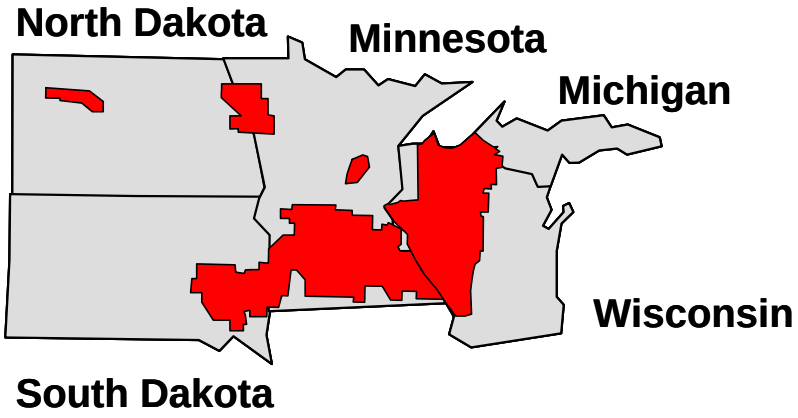
2.2 Description of Business and Service Area

Northern States Power Company is a public utility under the laws of the state of Minnesota. The legal name of Xcel Energy is Northern States Power Company ("NSP"), a Minnesota corporation (herein referred to as "Xcel Energy" or the "Company"). NSP and its parent public utility holding company, Xcel Energy, are headquartered in Minneapolis, Minnesota.

Xcel Energy is a public utility that generates electrical power, and transmits, distributes, and sells it to its residential and business customers within service territories assigned by state regulators in parts of Minnesota, Wisconsin, South Dakota, North Dakota, and the upper peninsula of Michigan. The Company owns and operates a number of electric generation facilities serving this area using a variety of technologies and fuels including, coal, oil, natural gas, hydropower, refuse derived fuel ("RDF") and nuclear. Wind, landfill gas, biomass and additional hydropower are also included in our generation portfolio through purchased power agreements.

Xcel Energy has 1.5 million electricity customers in its upper midwest service territory, shown in Figure 2-1, which includes parts of Minnesota, Wisconsin, Michigan, North Dakota and South Dakota.

Figure 2-1
Service Territory Map



The Monticello Nuclear Generating Plant is owned by Northern States Power Company, and is operated by Nuclear Management Company, LLC ("NMC") under contract with Xcel Energy. In addition to the Monticello plant, NMC operates the Company's Prairie Island Nuclear Generating Plant.[5]

2.3 Fee Determination

Minn. R. 7849.0210, subp. 1 establishes an application and processing fee of $10,000 plus $50 for each megawatt of plant capacity, plus "such additional fees as are reasonably necessary for completion of the evaluation of need for the proposed facility." Subpart 2 of the rule requires that 25 percent of the fee accompany the application with the balance paid in three equal installments within 45, 90, and 135 days after submission of the application. The proposal will increase the generating capacity of the Plant by an estimated 71 MW, resulting in a total fee of $13,550.

A check for $3,388 (25 percent) has been sent to the Commission at the time of filing this application. Thus, an additional $10,162 must be paid in three installments of $3,388. It is our understanding the Commission staff will determine the amount and timing of additional fees and request additional payments as necessary as this proceeding moves forward.

2.4 Filings and Permits Required

In order to increase the generating capacity of the Monticello plant, we must comply with three principal sets of requirements.

1) A Certificate of Need authorizing the increase must be obtained from the Minnesota Public Utilities Commission (Minn. Stat. § 216B.243, Minn. R. Part 7849),

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[5] The reintegration of the functions of the NMC into Xcel Energy are in process and expected to be completed by mid-year 2008.

2) A site permit authorizing the increase must be obtained from the Minnesota Public utilities Commission or local unit of government (Minn. Stat. § 216E.03),[6] and

3) A license amendment from the United States Nuclear Regulatory Commission must be obtained authorizing the plant to operate at the increased thermal power level and generating capacity.

2.4.1 Certificate of Need - Minnesota Public Utilities Commission

Minn. Stat. § 216B.243 requires a Certificate of Need be obtained before increasing the generating capacity of the Monticello plant by 50 MW or more. In certain circumstances this requirement may not apply. See Minn. Stat. § 216B.2422, subds. 5 and 6. We are seeking a CON for our two-staged proposal to increase the electrical generating capacity of Monticello from a nominal capacity of 585 MW to a nominal capacity of 656 MW. A more detailed description of our proposal is contained in Chapter 3 of this application.

2.4.2 LEPGP Site Permit - Minnesota Public Utilities Commission

Pursuant to Minn. Stat. § 216E.03, no person may construct a large electric power generating plant without first obtaining a site permit from the Commission. Generally, as part of the permitting process, the Department of Commerce ("Department") prepares an environmental impact statement on the project, and an administrative law judge from the Office of Administrative Hearings ("OAH") conducts a contested case hearing. Minn. Stat. § 216E.03, subd. 6.

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[6] A site permit is required before any person may construct any large electric power generating plant (50 MW or more). *See* Minn. Stat. § 216E.03, subd. 1. The definition of "construction" in the Minnesota Power Plant Siting Act ("Siting Act") states: "'Construction' means any clearing of land, excavation, or other action that would adversely affect the natural environment of the site or route but does not include changes needed for temporary use of sites or routes for non-utility purposes, or uses in securing survey or geological data, including necessary borings to ascertain foundation conditions." Minn. Stat. § 216E.01, subd. 3. The Monticello site exists with the "natural environment" already affected by the present plant. For purposes of triggering the Siting Act, the question is whether the uprate project as proposed would: "adversely affect the natural environment of the site." If the only outside plant activities occur on portions of the site that already contain plant facilities and do not "adversely affect the natural environment," the Siting Act may not be applicable.

Unless the Commission determines that a joint hearing on siting and need is not feasible or more efficient, or otherwise not in the public interest, Minn. Stat. § 216B.243, subd. 4 requires that a joint hearing be held.

An alternative permitting process is available for certain smaller-sized power plants identified in Minn. Stat. § 216E.04. These projects include a large electric power generating plant with a capacity of less than 80 megawatts. The alternative site permit review process does not require the applicant to propose a second site for the project; the preparation of an environmental assessment is required rather than an environmental impact statement; and a contested case hearing is not required (although the agency must hold a public hearing). Minn. Stat. § 216E.04, subds. 3, 5-6.

The proposed increase in generating capacity at the Monticello plant is less than 80 MW increase and consequently qualifies for the alternative permitting process or local authorization. On December 5, 2007, the Company filed notice with the Commission indicating we would seek review of our site permit application under the alternate permitting process for projects less than 80 MW as contained in Minn. R. 7849.5500 to 7849.5720 We are in the process of preparing the site permit application and will file it with the Commission by mid-2008.

2.4.3 Operating License Amendment—Nuclear Regulatory Commission (NRC)

The NRC is responsible for overseeing the safe operation of nuclear generation facilities. The NRC regulates the radiological, engineering, health and safety standards applicable to operating the Monticello plant. Therefore, the Company must apply for and receive an amendment to Monticello's operating license from the NRC prior to operating the facility up to the proposed higher power level. The regulatory approval process to amend a nuclear facility's operating license and technical specifications is governed by Title 10 of the Code of Federal Regulations, Part 50. The current plan is to file the operating license amendment approximately at the end of the first quarter of 2008.

2.4.4 Other Project Permits

In addition to the State and Federal permits mentioned above, the project will require interconnection approval and an updated transmission service agreement with the Midwest Independent System Operator ("MISO"). On January 10, 2007, the Company filed the required Generation Interconnection Agreement with MISO to cover the 2009 expected capacity increase of 15 MW (Q:39099-01). In September 2007, the Company also filed a transmission service request ("TSR") with MISO to increase our network resources for up to 621 MW to accommodate the MW increase.

On December 7, 2007, the Company filed a second-generation interconnection request to interconnect the 56 MW expected in 2011, and the necessary TSR for the additional 56 MW of network resources beginning in 2011.

We have identified no other required permits necessary for the Monticello power uprate project. Since the CON is to expand an existing plant, the plant already possesses a number of permits necessary to operate, such as Air Quality Permits, Water Appropriations, and Wastewater Discharge Permits. After reviewing the permit limits in relation to the planned uprate, it is not anticipated that any of the operating permits will require amendments due to the power uprate.

If a site permit is issued, no other zoning, building or land use rules by a regional, county or local government shall apply. See Minn. Stat. § 216E.10.

3 Project Description

This chapter of our Application provides a description of the Monticello Nuclear Generating Plant and the changes to the plant necessary to increase the electrical generating capacity by approximately 71 MW from a nominal capacity of 585 MW to 656 MW. It also contains the information required in the Commission's application content rules, Minn. R. 7849.0250 (A)[7]. Table 3-1 at the end of this chapter provides the requirements for Minn. R. 7849.0250 in tabular format.

3.1 General Plant Information

Monticello uses nuclear fuel in a single-unit boiling water reactor to produce on average 600 MW[8] of electricity. Monticello received its initial operating license from the NRC in September 1970. The initial license was for a period of 40 years and was scheduled to expire in 2010. The initial license has subsequently been renewed with the NRC for an additional 20 years. The renewed license expires in September 2030.

The Monticello plant is located within the city limits of Monticello, Minnesota in Wright County, on the western bank of the Mississippi River, in Section 32, T–122N, R–25W, at 45° 20' N latitude and 93° 50' W longitude, approximately 50 miles northwest of Minneapolis/ St. Paul (Figure 3-1 and 3-2).

The Plant site consists of approximately 2,150 acres of land owned by NSP. Part of this property is on the eastern bank of the river in Sherburne County and part is on the western bank in Wright County. Figure 3-3 shows the Plant site boundaries. A perimeter fence and other barriers restrict access to the plant.

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[7] See Table 3-1 for the Operational Information required in Minn. Rule 7849.0250 A, Minn. Rule 7849.0320 C, and Minn. Rule 7849.0320 E.

[8] In-house loads at Monticello range between 15 and 25 MW, resulting in a net ouput to the grid of approximately 585 MW.

The plant has an outstanding operating and safety record. It has received the General Electric ("GE") Outstanding Plant Performance Award for boiling water reactors 17 times. It has received the Minnesota Safety Council Award for the past five years for outstanding efforts in reducing workplace injuries or illnesses. Currently, the Plant has all green indicators in the NRC's Reactor Oversight Process. A "green" code is the highest or best available rating and indicates performance in compliance with requirements. The Plant has performed extremely well during its 38 years of operation.

Over the past five years (2002 through 2006), the plant has maintained an average capacity factor of 94.2 percent. In 2006, Monticello generated a record 5,070,000 megawatt-hours of electricity, eclipsing its prior record set in 2004. For 2007, the actual capacity factor was 81.66 percent for the entire year.[9] The proposed Monticello power uprate is not expected to impact the Monticello plant's reliability and high capacity factor.

Figure 3-4 shows an aerial photo depicting a 1-mile radius around the Plant.

Figure 3-5 shows an aerial photo depicting a 2-mile radius around the Plant.

Figure 3-6 shows a topographical map of the area around the Plant.

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[9] A refueling outage was conducted in 2007, which significantly affects the capacity factor.

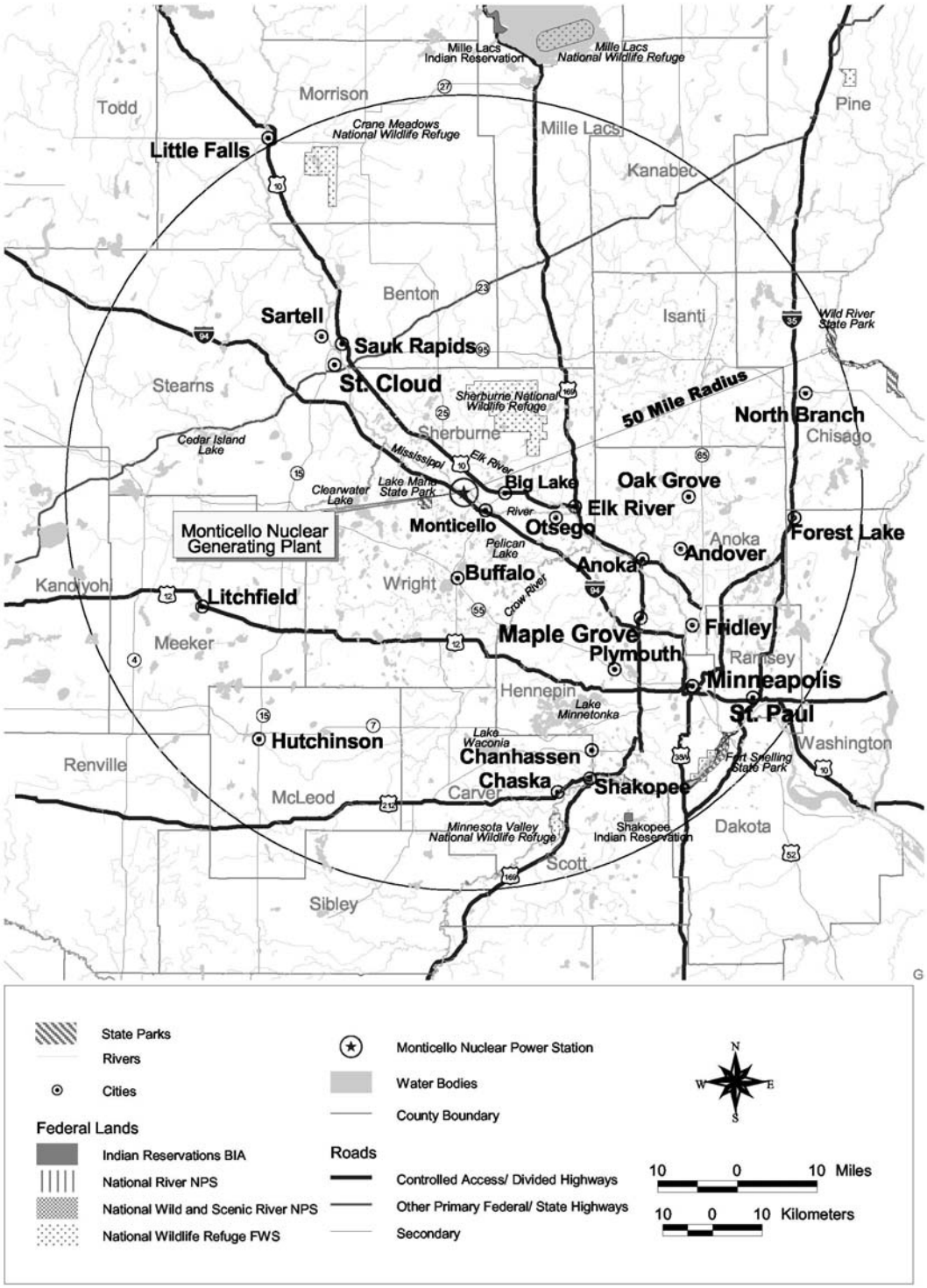

Figure 3-1, 50-mile Radius

Figure 3-2, Six-mile Radius

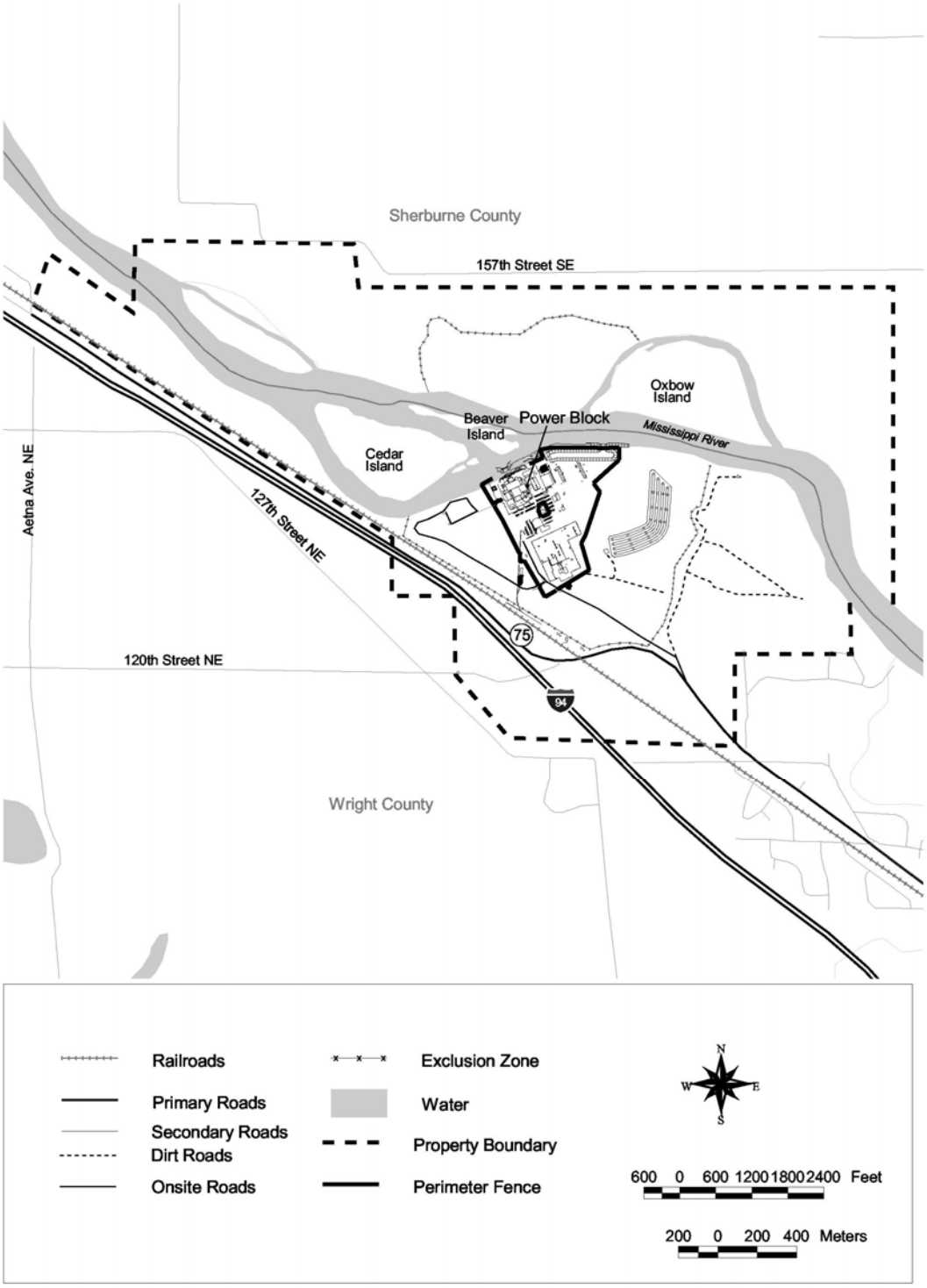

Figure 3-3, Plant Site Boundaries

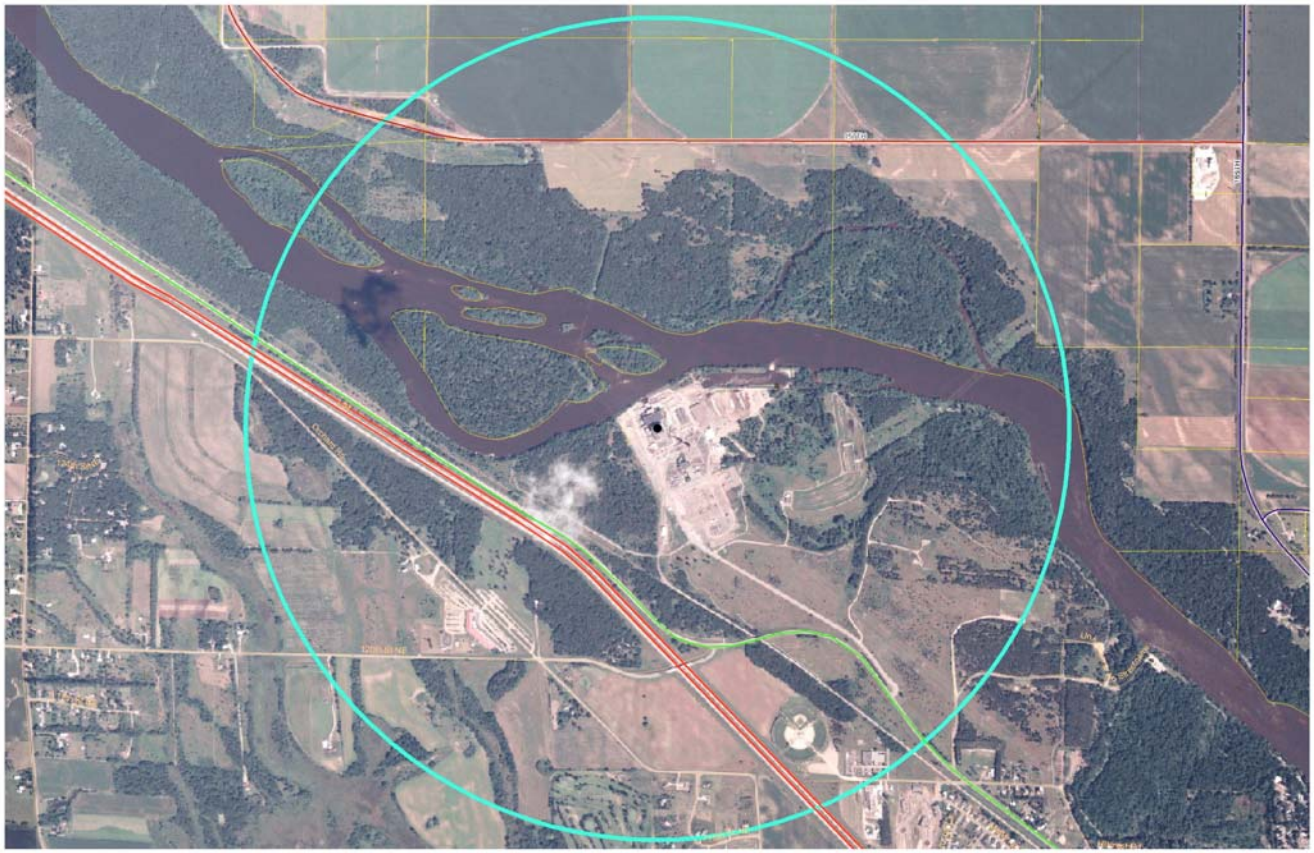

Figure 3-4, One-mile Radius

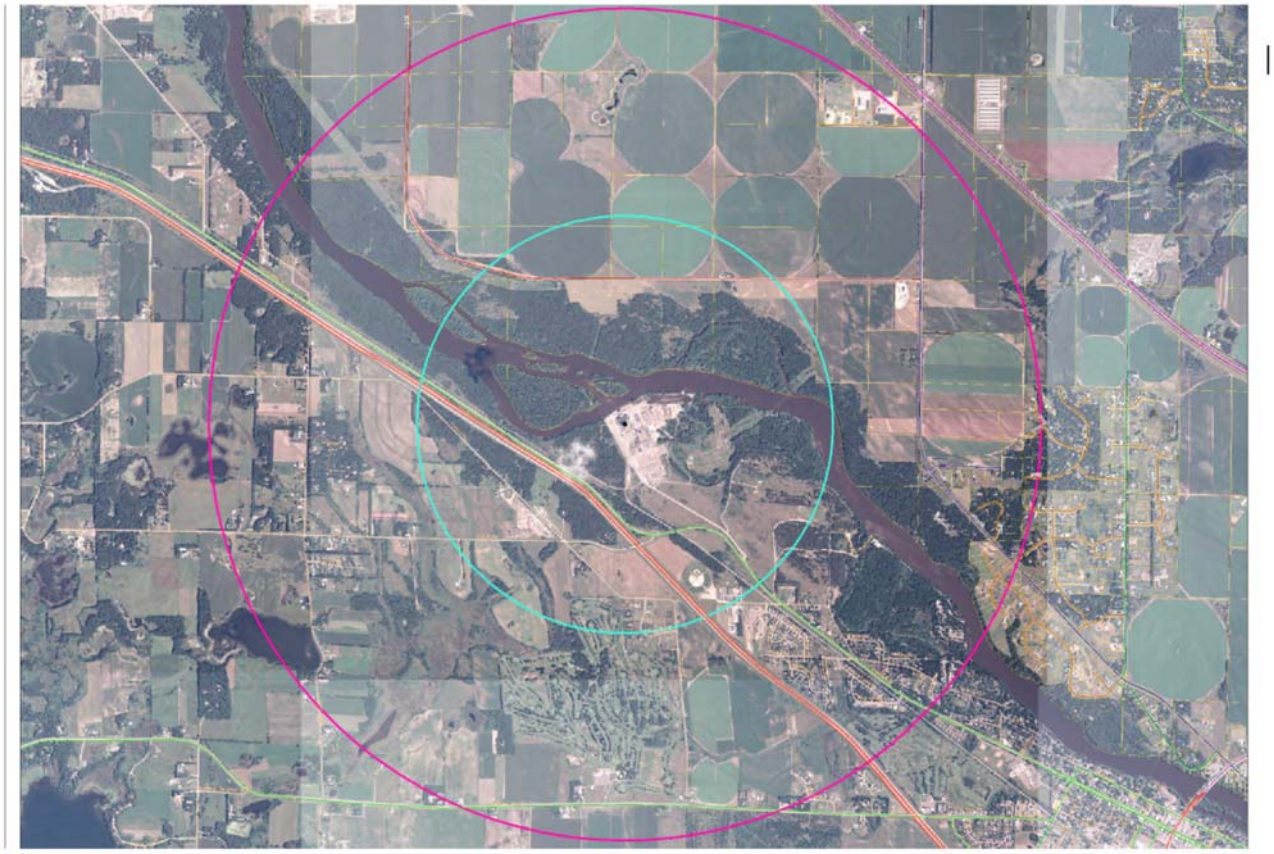

Figure 3-5, Two-mile Radius

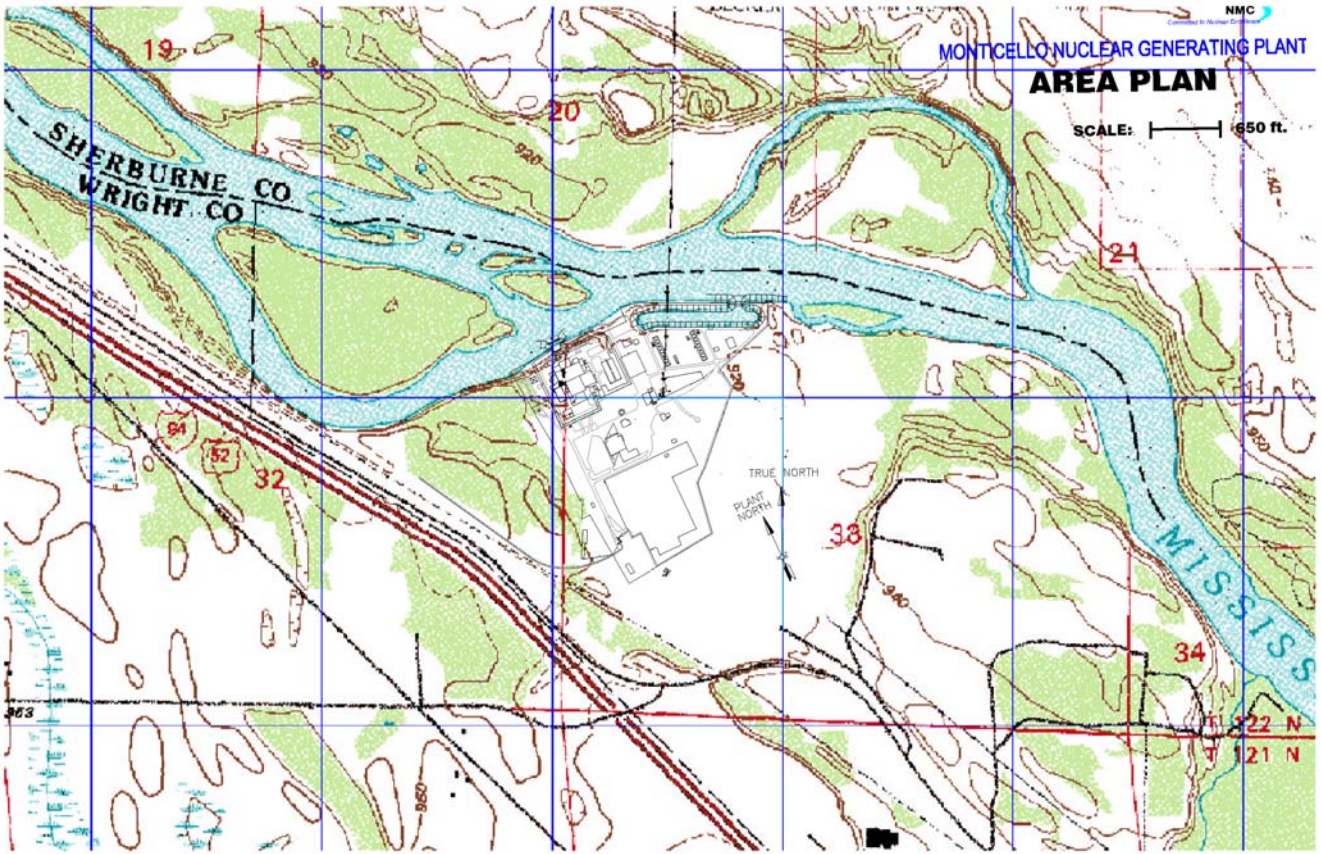

Figure 3-6, Area Topographical Map

3.2 Boiling Water Reactor Operation

Monticello is a boiling water reactor. In a boiling water reactor, a nuclear reaction in the reactor core generates heat, which boils water to produce steam inside the reactor vessel, which in turn is directed to turbine generators to produce electrical power (Figure 3-7). The steam is cooled in a condenser and returned to the reactor vessel to be boiled again. The cooling water is force-circulated by electrically powered feedwater pumps. Emergency cooling water is supplied by other pumps, which can be powered by onsite diesel generators.

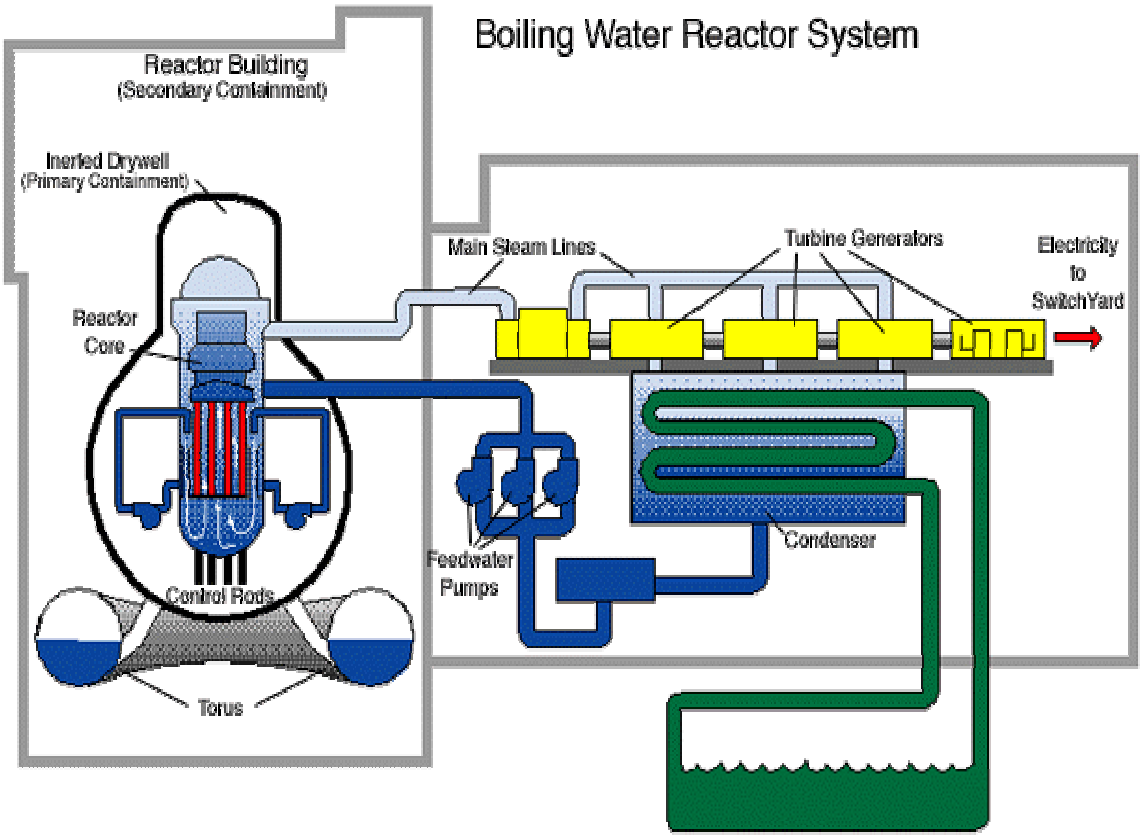

Figure 3-7 Boiling Water Reactor

3.3 Description of Fuel and Operating Cycle

Nuclear fuel is fabricated by GE and transported to the Plant by truck. GE was the original plant designer and has supplied the plant with almost all of its fuel.

A fuel assembly consists of a fuel bundle and a channel that surrounds it. Fuel rods are spaced in a square array secured by means of stainless steel upper and lower tie plates. Each fuel assembly is 5.28 by 5.28 inches wide and up to 172 inches long. Figure 3-8 shows a representation of a typical fuel assembly used at Monticello.

Each fuel rod within the assembly consists of high-density ceramic uranium dioxide fuel pellets, each about the size of a thimble, stacked in a tube made of a special alloy of steel called Zircaloy. The air in the filled tube is evacuated, helium (an inert gas) is backfilled, and the fuel rod is sealed by welding Zircaloy plugs in each end.

Each fuel assembly consists of standard fuel rods, part length fuel rods and tie rods. Standard rods contain the nuclear fuel, and part length rods are fuel rods that extend to an intermediate point in the assembly. Tie rods are included to provide support to the assembly. Fuel assemblies also contain water rods. Water rods are hollow Zircaloy tubes with several holes located at each end to facilitate water flow through the assembly. Fuel assemblies also contain spacers, springs and other components. A Zircaloy channel encloses the fuel bundle. The channel provides guidance and a bearing surface for the control rod, permits control of coolant flow, and provides mechanical support and protection during fuel handling operations. The plant's reactor core is comprised of 484 fuel assemblies, arranged in 121 cells. Each cell contains 4 fuel bundles or assemblies and a control blade.

Approximately every two years, the plant is shut down to refuel the reactor. Between refueling outages, the plant typically operates at full output around the clock. At current power level of 1775 MWt (585 MWe) approximately 150 of the 484 fuel bundles are replaced during refueling. Projections under power uprate conditions of 2004 MWt will require on average approximately 173 of the 484 fuel bundles to be replaced during refueling. Each individual nuclear fuel assembly provides heat for three fuel cycles or about a six-year period before its output declines to the point it is replaced to maintain the desired plant output level. These spent nuclear fuel assemblies are then removed from the reactor and stored in the spent fuel pool to cool and are ultimately placed in dry storage casks and moved to the Independent Spent Fuel Storage Installation ("ISFSI").

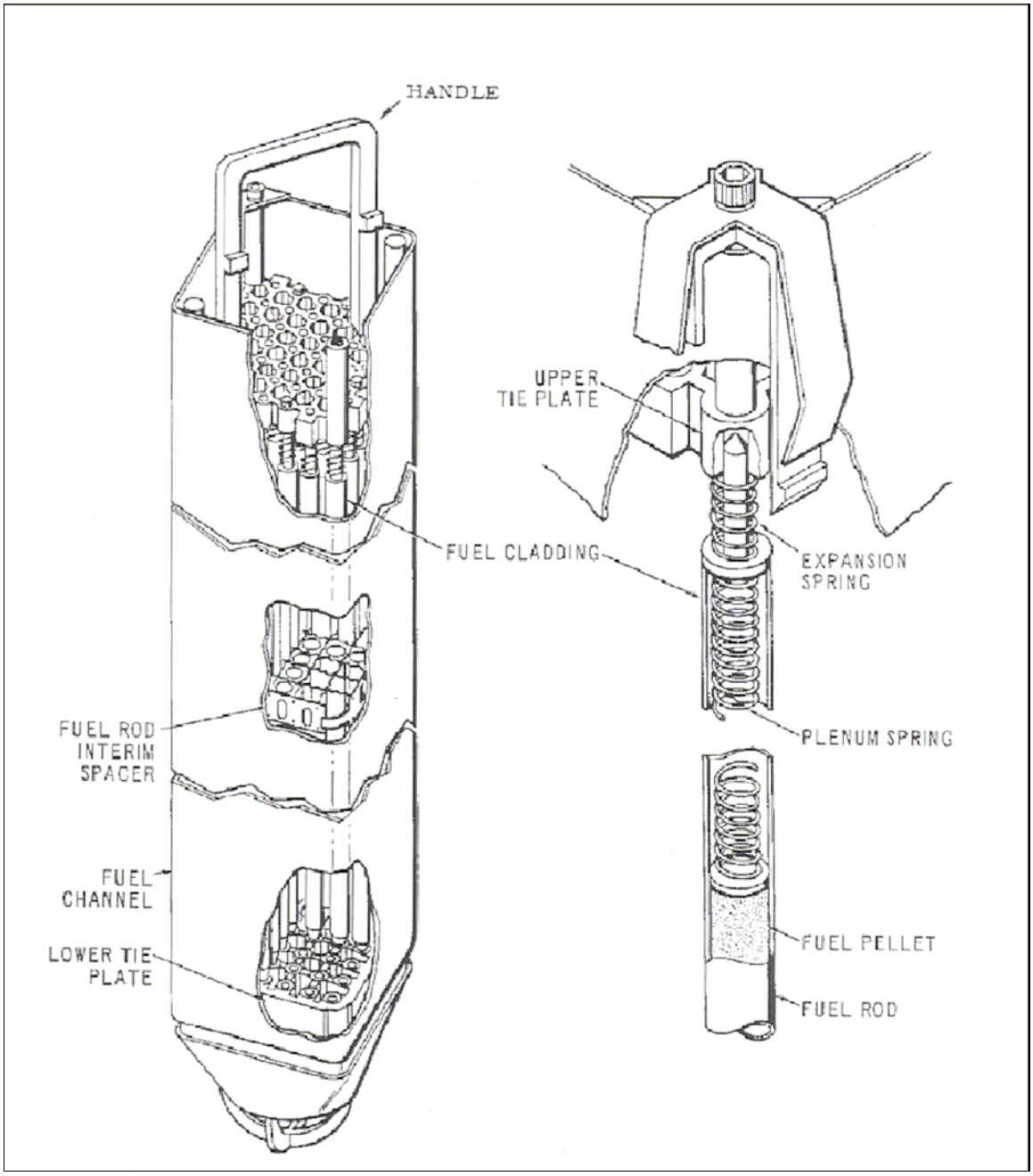

Figure 3.8 Typical Fuel Assembly

3.4 Fuel Availability

Availability of uranium to support the continued operation of Monticello with power uprate is not an issue. The Organization for Economic Cooperation and Development (OECD) and the International Atomic Energy Agency (IAEA) in 2005 jointly produced a report on uranium resources. The report states that uranium

resources are adequate to meet the needs of both existing as well as new reactors anticipated in the next decade. The agencies base their conclusion on official projections from 43 uranium-producing countries, as well as independent studies by the agencies.

3.5 History of Power Uprates

Several decades of reactor safety technology improvements, plant performance feedback, and improved fuel and core designs have shown that the Monticello (and many similar reactors throughout the United States) can operate at higher output than allowed under the original NRC license and still remain well within NRC calculated safe operational levels. Therefore, many nuclear power plants throughout the United States have requested power increases above the original NRC approved thermal power level. The NRC's webpage address for power uprate approval status is:

http://www.nrc.gov/reactors/operating/licensing/power-uprates/approved-applications.html.

As of December 2007, the NRC had completed 114 power uprate project reviews. This has resulted in approximately 4,914 additional MW for our nation's power supply grid. GE is the lead vendor for the power uprate projects for boiling water reactors and has been the primary engineering firm for each power uprate. Appendix E contains a list of the power uprates approved by the NRC.

Under NRC terminology, a power uprate of more than seven percent (up to a maximum of 20 percent) over the Original Licensed Thermal Power ("OLTP"), and which requires significant balance-of-plant upgrades, is called an "Extended Power Uprate" or "EPU".[10] As of October 2007, the NRC has approved extended power uprates for twelve boiling water reactors. NMC, in conjunction with the designer of Monticello, GE, has comprehensively evaluated the effects of the extended power uprate at the Monticello. Based on NRC action at similar plants, it is expected that the NRC evaluation will conclude that sufficient safety and design margins exist such that the rated core thermal power can be increased from 1775 to 2004 megawatts thermal

[10] The Monticello power uprate as proposed is technically an extended power uprate. It is being referred to generically as a power uprate within this Application for simplicity.

("MWt") without any adverse impact on the health and safety of the public and without any significant impact on the environment. We intend on filing an amendment to Monticello's operating license to allow for an increase in the licensed core thermal power level to 2004 MWt with the NRC by approximately end of first Quarter 2008.

3.6 Power Uprate History at Monticello

Monticello was the lead plant for GE's Power Uprate Program. In 1998, the thermal power rating for Monticello was increased from the original design rating of 1670 MWt to 1775 MWt, or 106.3 percent of OLTP. This first power uprate at Monticello was completed by making use of available excess equipment, system and component capabilities at the site. The site was able to increase generation by 35 MWe to a nominal net electrical output to the grid of 585 MWe with very few changes to installed plant equipment.

3.7 Proposed Power Uprate Project at Monticello

The power uprate at the Monticello plant will be achieved by: 1) increasing the amount of steam produced in the reactor; and 2) improving the balance-of-plant equipment that converts the steam into electricity. To obtain the higher steam flow the reactor will be operated at a higher thermal power level. The additional heat is achieved primarily by increasing the number of new fuel assemblies replaced in the reactor core at each refueling. This is done without increasing the operating reactor pressure and without changes to the fuel design or fuel design limits.

The goal of the current power uprate project is to increase the thermal power to 120 percent of the OLTP. This power uprate would increase reactor power from the current licensed thermal power level of 1775 MWt to 2004 MWt. The corresponding increase in net generator output is estimated at 71[11] MWe for a nominal net electrical output delivered to the grid of 656 MWe. The project will take place

[11] 71 MW is the average MW increase calculated by averaging the maximum calculated MW by month.. The monthly MW gain will vary from month to month due to weather, water and other criteria.

over two refueling outages[12] and will require very few modifications to the reactor and the reactor support systems that produce steam.

The balance–of-plant systems that convert the steam produced in the reactor to electricity however will need significant modifications. These modifications will be made during the planned 2009 and 2011 refueling outages. Some of the more significant balance-of-plant changes will be the replacement or modifications to the high-pressure and low-pressure turbines; replacement of the condensate demineralizer and a number of condensate pumps and motors; replacement, or modification, of the steam dryer; replacement of a number of feedwater pump and motors and related equipment.

The current average annual heat rate for Monticello requires 10.340 mbtu/MWh. The anticipated average annual heat rate following completion of the power uprate is 10.425 mbtu/MWh. A license amendment to the Monticello operating license addressing the safe operation at the higher thermal power level will be reviewed and approved by the NRC prior to increasing the thermal power level of the reactor.

3.8 Necessary Plant Modifications

The reactor output at Monticello will increase as a result of increased thermal power (steam production) due to the increased number of new fuel assemblies replaced in the reactor core at each refueling and changes in the fuel loading pattern. However, no changes in the mechanical design of the fuel or fuel design limits are required to implement the uprate.

Each reactor has an NRC imposed limit for the highest power level allowed for each fuel assembly. The highest fuel assembly power occurs in the middle of the core, but drops off toward the sides of the core. By increasing the heat output of the nuclear fuel around the

[12] By itself, the 15 MW uprate in 2009 does not require a certificate of need because it is less than the 50 MW threshold. See Minn. Stat. Section 216E.01, subd. 5; Minn. Rule 7849.5050. However the 2011 modifications result in an increase in generating capacity of 56 MW which require a certificate of need. While this project would be considered a "phased action" and require environmental review of both phases, there is no such requirement in certificate of need proceedings. See Power Line Task Force, Inc. v. Northern States Power Co., 2004 WL2659837 (Minn. App. Nov. 23, 2004)(holding that a certificate of need was not required for a power line phased action). Nonetheless, Xcel Energy is seeking a certificate of need covering both power uprates for a total 71 MW increase in generating capacity.

sides of the reactor core, the maximum output of a single fuel assembly and the highest fuel assembly power in the reactor center remains the same; but the overall average fuel assembly power increases and thus the steam output of the reactor increases. No changes in operating pressure or core flow are necessary. GE's calculations for previous power uprate projects have demonstrated to the NRC that GE's boiling water reactors can operate within safety margins using this approach.

However, to take advantage of the increased steam output, a number of "balance-of-plant" improvements will be required to the systems that convert the steam produced in the reactor to generate additional electricity.

The implementation of the power uprate is scheduled to take place during each of the next two routine refueling outages (2009 and 2011). The modifications completed during the 2009 refueling outage will increase output by approximately 15 MW, and the modifications completed during the 2011 refueling outage will increase output by approximately 56 MW.

The major modifications and a short description of the work to be completed on each during the two refueling outages are listed below. Additional smaller scope modifications will be identified during the detailed engineering phase of the project.

A. Replacement of the High Pressure Turbine Section (2009)

   The entire rotating element and diaphragm assemblies of the high-pressure turbine will be replaced with higher capacity components to accommodate the increased steam flow rate.

B. Modification of the Low Pressure Turbine Sections (2009)

   Several of the low-pressure turbine stages will be modified to accommodate the increased steam flow rate. This includes replacing various stage diaphragms and casing bolting.

C. Condensate Demineralizer Replacement (2009)

Additional condensate flow is required to support the power uprate. The existing demineralizer vessels will be replaced with larger ones.

D. Upgrades to Isophase Bus Duct Cooling System (2009)

The isophase bus conducts the electrical output of the main generator to the main transformer. Heat loads in the isolated phase bus duct will increase with the higher power levels that will result from the uprate creating a need to increase the cooling capability of the isophase bus ducts.

E. Replacement of Condensate Pump and Motor (2011)

Condensate pumps move water from the hot well of the condenser to the reactor feed water pumps. The reactor feed water pumps supply water to the reactor where it is heated to produce steam. In order to meet the increased demand for water to the reactor feed water pumps the condensate pumps will be replaced with different models to satisfy the increased flow and head requirements of the suction side of the reactor feed water pumps as a result of the extended power uprate.

F. Upgrade of Offsite Power Supplies to Power Larger Plant Loads (2011)

In order to provide power for the new reactor feedwater pumps/motors and new condensate pumps/motors and improve the reliability of the onsite auxiliary electrical distribution system, a new 13.8 KV bus and new 1R and 2R transformers and distribution systems will be installed.

G. Replacement, or Modification, of the Steam Dryer (2011)

The steam dryer is a component inside the reactor that removes water in liquid form from the steam before it goes to the turbine (water in liquid form could damage the turbine). Vibrations and the resulting stresses incurred by the steam

dryer increase as a result of power uprate. Therefore, instrumentation was installed during the 2007 outage to assess the current loading on the steam dryer. The ability of the existing steam dryer to withstand the additional stresses that will result from the uprate will be analyzed and a decision to modify or replace the steam dryer will be made at a later date.[13]

H. Rewind of the Main Generator Stator (2011)

The existing main generator stator would be above mechanical and electrical design limits at the proposed power uprate levels. The stator will be rewound to satisfy the new design requirements at the uprated power conditions.

I. Replacement of Feed Water Pumps and Motors (2011)

Reactor feed water pumps supply water to the reactor where it is heated to produce steam. In order to meet the increased demand for water to the reactor, more reactor feed water pump capacity is needed. In order to meet the increased demand for both steady-state and transient conditions, the feed water pumps and motors are being replaced with different models.

J. Feedwater Heater Drain Cooler Capacity (2011)

Feedwater heaters increase the temperature of the water that is being returned from the condenser to the reactor. With the increased flow of steam and water through the primary side of the feedwater heat exchangers, the capacity on the secondary sides of two of the heat exchangers need to be increased. Increasing the capacity is accomplished by increasing the outlet drain capacity on two of the feedwater heaters.

[13] The potential need to replace the steam dryer results in an additional $29 million of costs used to represent the upper cost threshold in Section 3.6.

3.9 Impact on Plant Operations

In general, operation of the plant will not change. The primary impact will be more frequent operation of the cooling towers to supplement the cooling provided by the Mississippi River over the course of a year. Currently, the cooling towers are typically used during low river flow and times of the year when there are high ambient temperatures, normally during the summer months. The cooling needs of the circulating water system will increase due to the power uprate, and thus, require the use of the supplemental cooling system more frequently. If extreme conditions warrant, the facility will reduce power to remain within the constraints of existing water permits.

3.10 Impact on Spent Fuel Produced

Approximately every two years, Monticello is shut down to refuel the reactor. Between refueling outages Monticello typically operates at full output around the clock. At the current power level of 1775 MWt, approximately 150 of the 484 fuel bundles are replaced during refueling. The increased power level to 2004 MWt proposed under the uprate project would increase the number of fuel bundles being replaced during each refueling to on average approximately 173 of the 484. This will result in a total of approximately 230 additional fuel assemblies being produced over the remaining operating license period due to power uprate. Considering the space available in the spent fuel pool, three new dry storage canisters may be necessary to support operations until 2030 due to the power uprate project. The three additional dry-storage canisters do not become necessary until approximately the 2025 time-frame. We are not requesting additional storage canisters at this time because it is anticipated that the federal government could begin removing spent fuel from Monticello in time to preclude the need for more than the 30 canisters already approved.

3.11 Project Information Required by 7849.0250(c)[14]

3.11.1 Capacity Cost

In our January 2, 2007 compliance filing in Docket E002/RP-04-1752, we estimated the installed cost of the additional 71 MW of capacity at Monticello achieved by power uprate to be $1,815/kw. Since January the cost estimates have been refined and if we conclude that the steam dryer does not need to be replaced, the installed cost of the additional 71 MW of capacity will be $1,465/kw. If it is ultimately decided the steam dryer does need to be replaced, the installed cost will be $1,873/kw.

3.11.2 Service Life

The service life of this capacity will be until September 2030, when Monticello's operating license with the United States Nuclear Regulatory Commission expires.

3.11.3 Average Annual Availability

Other than during refueling outages, which nominally occur approximately every 22 months for a duration of approximately 1 month, this capacity should be available 24 hours a day 7 days per week. Assuming a 3 percent forced outage rate annually, this translates into an availability factor of 93.5 percent for this capacity. For comparison, over the last 5 years (2002-2006) Monticello has averaged a 94.2 percent capacity factor.

3.11.4 Water Use

3.11.4.1 Groundwater Use

Groundwater use for the facility is permitted by the DNR water appropriations permit number 67-0083. The permit pertains to two water wells, each equipped with a 100-gpm capacity pump that are

[14] See Table 3--1 for a complete listing of the operational Information required in Minn. Rule 7849.0250 A, Minn. Rule 7849.0320 C, and Minn. Rule 7849.0320 E.

connected together and are regulated under a single water appropriations permit with a withdrawal limit of 200 gpm. From 1998 to 2006, actual usage averaged less than 38 gpm. The two permitted wells provide domestic potable water to the plant administration building, raw water to the reverse osmosis/make-up demineralizer system, and seal water to pumps at the plant intake structure. There are four additional wells operated at the facility for potable and non-potable uses similar to those above. However, these wells have usage below 10,000 gallons per day and are not required to have a water appropriation permit. The power uprate project will not affect the two well water permits.

3.11.4.2 Surface Water Use

Cooling water for Monticello is primary drawn from the Mississippi River. Surface water use is permitted by the DNR under a surface water appropriation permit. The permit allows withdrawal of up to 645 cfs (or 290,000 gpm) of water from the Mississippi River, with special operating conditions if the river flow is less than 860 cfs, and further restrictions if river flow is 240 cfs or less. Surface water is used for plant condenser cooling and auxiliary water systems, such as service water cooling, intake screen wash, and fire protection. Under typical river conditions, the circulating water system removes heat from the Monticello condenser by the once-through circulating water system. If necessary to maintain discharge temperatures, or under certain discharge canal temperature, river temperature, and/or river flow conditions, the circulating water system can use two mechanical draft cooling towers in partial or complete recirculation of the cooling water to maintain compliance with permit limits.

Less than 2 percent of the water withdrawn from the Mississippi River for cooling is lost to the atmosphere due to both open cycle evaporative losses and cooling tower evaporation and drift. Currently, total water consumption at Monticello is estimated to be approximately 6,800 acre-ft/year (9.4 cfs) assuming 130 days of cooling tower operation, 235 days of open-cycle operation and nominal values of cooling tower flow.

Following the uprate project, assuming an increase in open cycle consumption of 20 percent, an increase in days of cooling tower operation to 150 days/year and nominal values of cooling tower flow results in an estimated consumption of 7,700 acre-ft/year (10.6 cfs).

This level is still well below the level determined to be insignificant in the NRC Environmental Impact Statement ("EIS") completed for Monticello's re-licensing (NRC, 2006). Using the maximum surface water appropriation limit of 645 cubic feet/second as the cooling tower flow value would only result in an estimated total water consumption of 8,700 acre-ft/year (12 cfs). Thus, the uprate project will not involve any changes to the water appropriation requirements of the surface water permit.

Table 3-1: Monticello Operational Information Summary

Rule Reference	Description	Monticello Power Uprate
Capacity		71 MWe
Annual Capacity Factor		• 88.8% during years with refueling outage • 97% during years without refueling outage • Assumes a 3% forced outage rate
Typical Availability		Because nuclear power plants are dispatched and operated whenever they are available, the capacity factor and availability factors are the same.
7849.0250 A (1)	Nominal generating capability	71 MW
7849.0250 A (2)	Operating Cycle	30 day refueling outage every 2 years
7849.0250 A (2)	Anticipated annual capacity factor	• 88.8% during years with refueling outage • 97% during years without refueling outage • Assumes a 3% forced outage rate
7849.0250 A (3)	Type of fuel used	Uranium
7849.0250 A (3)	Availability of fuel	Both the OECD and IAEA project uranium supplies are adequate to meet the needs of nuclear power plants worldwide, as well as new reactors anticipated in the next decade. The agencies base their conclusion on official projections from 43 uranium-producing countries, as well as independent studies by the agencies.
7849.0250 A (3)	Alternative fuels	None
7849.0250 A (4)	Anticipated heat rate (efficiency) (ISO Conditions)	10.425 mbtu/MWh

4 Project Environmental Information

4.1 Overview

This Chapter of our Application discusses the environmental impacts of the proposed project, and provides the environmental data required under Minn. Rules 7849.0310, 7849.0320 and 7849.0340. The environmental impacts of the alternatives to the proposed project are discussed in Section 6.8. The areas identified as potential environmental impacts are summarized below and discussed in greater depth in this Chapter. Table 4-5 at the end of this chapter provides the requirements for Minn. R. 7849.320 in tabular form.

1) Overall, the most noteworthy environmental impact is the significant carbon reduction that will occur over the next twenty years due to the Monticello project as compared to the alternatives. The average annual tons of carbon saved will be in excess of 330,000 tons/year starting in 2012, the implementation of both phases of the power uprate project. The project will result in over 6.2 million tons of carbon not being released into the atmosphere over the life of the plant.

2) The uprate project will result in a small temperature increase in the circulating water leaving the main condenser due to the increase in thermal power output. However, cooling water discharge temperature will be managed through increased use of the cooling towers or other methods. As a result, the thermal discharge will remain within the limits of the recently reissued National Pollutant Discharge Elimination System ("NPDES") permit. Since no changes are planned for the plant intake system or intake flow rates, no change in permitted water appropriation is required.

3) The amount of water consumption will increase slightly due to this project, but remain well below the level the NRC determined to be insignificant in their Environmental Impact Statement ("EIS") for Monticello's re-licensing (NRC 2006).

4) The project will slightly increase the maximum projected annual off-site dose and cumulative radiation dose. However, on-site and off-site radiological doses will remain well below federal regulatory limits.

The uprate will not affect the storage requirements for above- or below-ground tanks. Except for transportation of equipment during construction and the routine disposal of waste, the uprate maintenance activities are confined to the inner-plant security fenced area. Other lands located outside the inner security fence will not be modified or changed to support uprate activities. The uprate will not involve changes to any aesthetic resources and does not involve any impacts to lands with historical or archaeological significance. There will be no affect on threatened or endangered species and the impacts on aquatic communities will be minimal.

4.2 Environmental Information

4.2.1 Land Requirements (Minn. R. 7849.0320(A))

The Monticello project will not increase the land requirements for the generating plant. The project does not involve the construction of any new facilities, access roads, parking areas, or lay down areas. The only permanent change outside the existing facilities will be the addition of a new 13.8 KV bus and new 1R and 2R transformers. These improvements are necessary to assure the reliability of the onsite auxiliary electrical distribution system. Except for transportation of equipment and routine disposal of waste, power uprate maintenance activities will be confined to the inner-plant security fenced area. The uprate project will not affect the storage requirements for above- or below-ground tanks. Other lands located outside the inner security fence will not be modified or changed to support power uprate activities. The Project will not involve changes to any aesthetic resources and will not impact lands with historical or archaeological significance.

The projected levels of radioactive waste generated are within the current processing and storage capacity. Thus, we do not anticipate the need to construct additional or new low-level radioactive waste storage buildings to support power uprate activities. It is our intent to dispose of the old turbine components and other equipment that are being replaced

by contracting with an offsite licensed radioactive material processor for their decontamination and salvage, and thus no additional land requirements are necessary.

4.2.2 Traffic (Minn. R. 7849.0320(B))

Plant modifications to accomplish power uprate will be completed primarily during the 2009 and 2011 refueling outages. We do not expect the number of workers at the Plant to be significantly higher during the refueling outages when power uprate is implemented than during non-power uprate refueling outages. There are approximately 500 additional workers on-site during a typical refueling outage. It is estimated the power uprate construction will increase that by a few dozen more. Since the uprate project will only minimally increase the number of workers at Monticello during the outage, the additional traffic generated is negligible. Power uprate equipment deliveries will involve similar types of equipment deliveries as have been made for past refueling outages. After the project has been implemented, the on-going operation of the plant will not require additional employees and traffic will not differ from current levels.

4.2.3 Water Use for Alternate Cooling Systems (7849.0320(E))

4.2.3.1 Groundwater

The power uprate will not involve significant increases in groundwater consumption and thus will not affect groundwater resource permit limits.

Station groundwater use is governed by water appropriation limits of the Minnesota Department of Natural Resources (MDNR). The domestic water supply is obtained from six wells located on the plant property. No dewatering or collector-type wells (Ranney wells) are used at the Monticello plant. The Domestic Water System, which is serviced by two 100 gpm wells, provides domestic water to lavatories, showers, and laundries and provides raw water to the reverse-osmosis system and seal water to certain pumps located at the plant intake structure. Groundwater appropriation permit number 670083 establishes limits associated with these 100 gpm wells. The uprate project does not affect compliance with these limits. The annual appropriation limit is 20 million gallons and annual usage over the last five years (2002-2006) is less than 17 million

gallons. Any increases in makeup to plant systems from these sources are expected to be minor, and operation within the allowable limit will continue. Four smaller capacity wells (that are not required to be addressed via a groundwater appropriation permit) provide water to office, warehouse, and security facilities not serviced by the Domestic Water System. The wells are of standard vertical construction. The uprate project has no effect on these sources.

4.2.3.2 Surface Water Appropriation

Based on a range of assumptions, the power uprate will increase surface water appropriations by approximately between 900 and 1, 900-acre ft/year. This increase is within the limits of the current surface water permit.

Surface water use at Monticello is in accordance with the water appropriation limits of the MDNR. Under surface water appropriation permit number PA 66-1172-S, Monticello draws water from the Mississippi River for plant condenser cooling and auxiliary water systems, such as service water cooling, intake screen wash, and fire protection. Under typical river conditions, the circulating water system removes heat from the Monticello condenser by the once-through circulating water system. Under certain discharge canal temperature, river temperature, and river flow conditions; the circulating water system can utilize the two mechanical draft-cooling towers in partial or complete recirculation of the cooling water in compliance with permit limits. The operating modes for the circulating water system are required by the NPDES permit discharge limits and the Surface Water Appropriations Permit. The Surface Water Appropriations Permit allows us to withdraw up to 645 cfs (or 290,000 gpm) of water from the Mississippi River, with special operating conditions if the river flow is less than 860 cfs, and further restrictions if river flow is 240 cfs or less. The NPDES permit specifies maximum daily average temperature at the end of the discharge canal depending on the month.

Currently, the surface water consumption due to open cycle evaporative losses and cooling tower evaporation and drift is estimated at approximately 6,800 acre-ft/year, assuming 130 days of cooling tower operation, 235 days of open-cycle operation and nominal values of cooling tower flow (approximately 509 cubic feet/second). Assuming

an increase in open cycle consumption of 20%, an increase in days of cooling tower operation to 150 days/year, and nominal values of cooling tower flow, will result in an estimated consumption of 7,700 acre-ft/year. Using the maximum surface water appropriation limit of 645 cubic feet/second as the cooling tower flow value results in an estimated total consumption of approximately 8,700 acre-ft/year. (It is important to recognize that this appropriation limit for cooling tower flow is very conservative because the cooling towers are typically operated in "Helper" mode (i.e., not all circulating water flow is passed over the cooling towers).)

Even the most conservative estimate (i.e., 8,700 acre-ft/year) of consumption is below the value of 9,000 acre-ft/year that has been previously evaluated by the NRC in Monticello's Final Environmental Statement (FES) for a combined consumption of open cycle and cooling tower operations. This 8,700 acre-ft/year estimate is also well below the 13,000 acre-ft/year the NRC evaluated in NUREG-1437, Supplement 26, Published August 2006, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Monticello Nuclear Generating Plant" where it concluded that "the consumptive loss due to evaporation from the cooling towers represents four percent of the river flow, which is not considered significant." The NRC further concluded, "the staff expects that the existing State restrictions on water withdrawal during low-flow conditions in the Mississippi River are appropriate and no additional mitigation measures are warranted."

Actual cooling tower operation is estimated at 150 days per year, which is less than the FES assumption of approximately 210 days per year (April through October). The nominal value of 7,700 acre-ft/year, which is most representative of actual cooling tower operating flow rates, is also well below the 9,000 acre-ft/year value used in the FES and the 13,000 acre-ft/year referenced in NUREG-1437, Supplement 26. Thus, the power uprate project will not involve any changes to the water appropriation requirements of the surface water permit. Additionally, the estimated additional surface water consumption due to power uprate is bounded by values previously evaluated by the NRC and is not considered to be significant.

4.2.4 Water Discharges (Minn. R. 7849.0320(F))

The Monticello project will not result in any increase in wastewater discharges beyond those allowed under the current applicable permit.

Wastewater discharges are regulated by the State of Minnesota. The NPDES permit is periodically reviewed and re-issued by the Minnesota Pollution Control Agency ("MPCA"). The NPDES permit for Monticello, permit number MN0000868, expired on July 31, 2007. The MPCA issued a new NPDES permit on October 16, 2007.

The NPDES permit authorizes discharges from five outfalls and requires monitoring at the river water intake. The outfalls and their effluent limits are listed in Table 4-1. The only outfall to be affected by the power uprate is outfall SD 001, which will see a slight increase in circulating water discharge temperature. No changes to the permit requirements, other than administrative and descriptive changes, are necessary to implement power uprate. None of the limits listed in Table 4-1 will require modification.

Table 4-1 NPDES Discharge Limits

Outfall #	Description	Parameter	Limit
SD 001	Plant Cooling Water Discharge	Bromine	Monitor Only
		Chlorination	2.0 hr/day (daily max)
		Chlorine Rate	Monitor Only
		Flow (mgd) monthly avg.	Monitor Only
		Flow (mgd) calendar month max	Monitor Only
		Flow (MG) calendar month total	Monitor Only
		Oxidants, Total Residual	0.2 mg/l (instantaneous max.)
		Phosphorus, Total (as P)	Monitor Only
		Plant Capacity Factor	Monitor Only
		Discharge Temperature °F	Seasonal
SD 003	Holdup Pond Effluent Discharge Need to add a line for Phosphorus Flow parameters list should be the same as SD 004	Flow (mgd)	Monitor Only
		PH	6.0 SU min to 9.0 SU max
		Total Suspended Solids	9.9 kg/day monthly avg.
		Total Suspended Solids	30 mg/L monthly avg.
		Total Suspended Solids	33.2 kg/day daily max
		Total Suspended Solids	100 mg/L daily max

Outfall #	Description	Parameter	Limit
SD 004	Turbine Building Sump & Miscellaneous Discharge	Flow (mgd) monthly avg.	Monitor Only
		Flow (mgd) calendar month max	Monitor Only
		Flow (MG) calendar month total	Monitor Only
		Oil and Grease	4.2 kg/day calendar month avg.
		Oil and Grease	10 mg/L calendar month avg.
		Oil and Grease	15 mg/L daily max
		Oil and Grease	6.3 kg/day max calendar week avg.
		pH	6.0 SU min to 9.0 SU max
		Total Suspended Solids	12.7 kg/day calendar month avg.
		Total Suspended Solids	30 mg/L calendar month avg.
		Total Suspended Solids	42.3 kg/day daily max
		Total Suspended Solids	100 mg/L daily max
SD 005	Screen Backwash & Roof/Yard Drain	Flow (mgd) monthly avg.	Monitor Only
		Flow (mgd) calendar month max	
		Flow (MG) calendar month total	
SD 006	Screen Backwash & Roof/Yard Drains	Flow (mgd) monthly avg.	Monitor Only
		Flow (mgd) calendar month max	
		Flow (MG) calendar month total	
SW 001	Water Intake	°F Calendar Month Avg.	Monitor Only
		°F Calendar Month Max	
		°F Calendar Month Minimum	
		Phosphorus Calendar Month Average	Monitor Only
WS 001	Mid-downstream discharge canal	Oxidants, Total Residual	0.05 mg/L daily max

a In no case shall the maximum daily average temperature at the end of the discharge canal exceed the following limits:
(i) During the months of April through October: 95 °F
(ii) During the months of November and March: 85 °F
(iii) During the months of December through February: 80 °F

4.2.4.1 Increase in Circulating Water Discharge Temperature

The uprate project will result in slight increases in circulating water outlet temperature, but these increases will not exceed the limits currently established by the MPCA and will not result in any significant impacts to the environment.

Monticello is equipped with a once-through cooling system with cooling towers that can operate in various modes to meet permit requirements for water appropriations and thermal discharge. Cooling water is withdrawn from the Mississippi River using two 140,000 gallons per minute (gpm) water pumps. The water is circulated through the condenser and then routed, along with the service water, to the discharge structure. During open cycle operation, i.e., when ambient river water temperature is less than 68 degrees Fahrenheit (°F) (and river flow is adequate), the condenser effluent is routed to an open canal and discharged directly to the river. Open-cycle operation is typical from about mid-September to mid-May. When river temperatures exceed 68°F and river flow is adequate, condenser effluent from the discharge structure is pumped into two, induced-draft cooling towers, and then to the river via the discharge canal. Under high temperature and/or low flow conditions, Monticello can also be operated in a partial recirculation or closed-cycle mode. These alternative operating modes are used to comply within DNR water appropriation restrictions and MPCA thermal discharge limits established in the NPDES permit.

After project implementation, the heat rejected by the condenser will increase. This results in a corresponding increase in the circulating water outlet temperature for a given system flow rate. The steam cycle heat dissipation is provided by the Circulating Water System and the Cooling Tower System and is the source of thermal discharges from the plant. No physical modifications or operational changes are required for these systems to implement power uprate.

The NPDES permit issued by the MPCA limits maximum average daily discharge temperatures at the end of the discharge canal (Table 4-2 below). The uprate project will not involve any changes to the MPCA discharge temperature limits. Extensive field studies have been performed to confirm that the limits imposed by the NPDES permit are conservative and assure no significant adverse impact on the environment. These temperature studies ended in 1988 when the MPCA determined that 20 years of temperature monitoring had adequately characterized the thermal impacts of Monticello operation. Based on those studies as well as ongoing annual fisheries studies that evaluate Monticello's impact on the river ecosystem, cooling tower operation during the summer months has adequately prevented detrimental environmental effects, and water temperatures downstream are not high enough to harm aquatic species or

impede fish migration even in summer months. Temperature monitoring of outfall SD 001 (discharge canal) is continuous, and we consistently operate Monticello in conformance with the permit's thermal discharge requirements.

The temperature increase across the intake and plant discharge is highest in fall and winter, when once-through cooling is employed. The temperature increase is lowest in summer and during periods of low river flow, when NPDES permit limits associated with upstream average river temperature necessitate cooling tower use. During open cycle operation (winter) at rated circulating water system flow, it is conservatively estimated that the uprate will result in an increase in temperature of water entering the discharge canal by approximately 4.5°F. During other modes of operation, the water temperature increase will be less due to tempering from partial or full cooling tower operation. With cooling towers in service, the discharge canal temperature is expected to increase less. The calculated maximum temperature increase of 4.5°F at the discharge canal inlet would be experienced during months when cooling tower operation is not required to meet NPDES permit temperature requirements. This resultant discharge canal temperature increase is well bounded by seasonal variations.

The operating modes and conditions of the NPDES Permit are summarized in Table 4-2.

Table 4-2
Operating Conditions of NPDES

Date Range	Temperature (°F)
April – October	95
November and March	85
December – February	80

A slight inlet temperature increase would not involve any significant increase in harmful thermophilic organisms in the discharge canal. Monticello's daily average discharge canal temperatures range from 66 to 95 °F when the plant is operating and rarely averages more than 90°F

over a month. Thermophilic bacteria generally occur at temperatures of 25 to 80°C (77-176°F), with maximum growth at 50 to 60°C (122-140°F). Pathogenic forms have evolved to survive in the digestive tract of mammals and, accordingly, have optimum temperatures of around 37°C (99°F). Similarly, pathogenic protozoans, such as Naegleria fowleri, have maximum growth and reproduction at temperatures ranging from 35 to 45°C (95-113°F) and are rarely found in water cooler than 35°C (95°F).

Another factor limiting concentrations of pathogenic microorganisms in Monticello's discharge is the absence of a seed source or inoculants. Wastewater, whether municipal sewage, industrial wastewater, or agricultural runoff, is usually the source of pathogens in natural waters. Since October 1983, the Monticello plant has pumped its sanitary wastes to the City of Monticello's wastewater treatment plant. Consequently, the uprate project does not involve significant discharges of pathogenic microorganisms to the discharge canal and the Mississippi River. Pathogenic organisms in the Mississippi River downstream of the Monticello plant would typically come from upstream anthropogenic sources or animal wastes.

Plant operation at the increase power level is not expected to stimulate growth and reproduction of pathogenic microorganisms in the Mississippi River downstream of the plant. Under certain circumstances these organisms may be present in the discharge canal, but not in sufficient concentrations to pose a threat to downstream water users. It should be noted that many of these pathogenic microorganisms (e.g., *Pseudomonas*, *Salmonella*, and *Shigella*) are ubiquitous in nature, occurring in the digestive tracts of wild mammals and birds, but are usually only a problem when the host is immunologically compromised.

Given the information presented, the slight increases in circulating water outlet temperature due to power uprate will not involve any changes in compliance with the present discharge temperature limits established by the MPCA and will not result in any significant impacts to the environment.

4.2.4.2 Water Quality Monitoring

Water quality monitoring programs are detailed in the Monticello's Monitoring Plan in accordance with the NPDES permit. Effluent limitations and monitoring requirements for the discharges are an integral part of the NPDES permit. Each outfall identified in the permit requires continuous flowrate monitoring when discharging. Chemical discharges from Monticello have been nominally less than those predicted in the 1971 Environmental Report. Modifications of the non-radiological drain systems or the retention basin system are not required as part of power uprate, and biocide/chemical discharges will be consistent within existing permit limits. No new contaminants or pollutants will be introduced as a result of power uprate, nor will contaminants presently allowed for release by the MPCA be significantly increased.

The present NPDES permit requires the operation of cooling towers when the inlet river temperature is consistently at or above 68°F. Based on an examination of operating temperatures, we have determined that the 68°F river temperature requirement would preempt the 95°F discharge temperature requirement in all but a few cases. As stated previously, we have determined that an additional 20 days of cooling tower operation may be required to support power uprate operation to meet the 95°F maximum discharge canal limit.

Bromine and sodium hypochlorite are injected into plant water systems at various concentrations to minimize microbiological fouling. The additional 20 days of operation may require a very slight increase in normal bromine and sodium hypochlorite injection. The discharge of any additional residual halogens attributable to the additional cooling tower operation is expected to be insignificant, and effluent concentrations would continue to be well below the NPDES daily discharge limits.

4.2.4.3 Mississippi River Thermal Plume

The results of the Section 316(a) demonstration (Ref. 10) for Monticello determined that operation has had subtle alterations in the structure of some aquatic communities, but these impacts have been limited to a small area directly downstream of the plant. Biological diversity has not suffered and may have been enhanced by thermal inputs during certain times of the year. Based on available information, the minor increase in

thermal output to the river due to power uprate is not expected to result in any impacts on aquatic biota that are different in kind or greater in magnitude than those identified over the past 25 years.

In addition to the 316(a) demonstration, we conducted thermal plume studies following the construction of the discharge canal weir. These studies showed that even in the worst-case year the thermal plume disperses rapidly, is largely restricted to the near side of the river, and is not a barrier to fish movement. In addition, depending on the ambient conditions and the distance downstream from the plant, roughly 30 to 70 percent of the river is unaffected by the heated discharge. The uprate will not alter water volume requirements for the heat dissipation system, the physical construction of the discharge canal terminus, or temperature limits established by the NPDES permit. Therefore, the uprate does not change the findings of the thermal gradient and plume studies and will not affect the NPDES permit.

4.2.4.4 Cold Shock

Cold shock is caused by an unplanned shutdown; the probability of an unplanned shutdown is independent of power uprate. The projected increase in discharge canal inlet temperature of 4.5°F does not result in a significant increase in the overall discharge canal temperature, thus the magnitude of the temperature decrease in a cold shock situation is not significantly changed. The cold shock concerns of river fish species have been reduced by the construction of a weir at the end of the discharge canal, and by backwashing of the traveling screens above 50°F. The weir limits the number of fish in the discharge canal and reduces the effects of cold shock on aquatic species in the river. In addition, administrative procedures for controlled temperature reduction of the discharge canal are in place to minimize thermal shock to the aquatic biota.

4.2.4.5 Impingement and Entrainment

Section 316(b) of the Clean Water Act requires any standard established pursuant to 301 or 306 to require the location, design, construction, and capacity of cooling water intake structures to reflect the best technology available for minimizing adverse environmental impacts [33 USC 1326 (b)]. Entrainment of fish and shellfish in the early life stages through the

condenser cooling system is one of the potential adverse environmental impacts that can be minimized by the use of the best available technology.

A 316(b) Demonstration was developed and submitted to the MPCA in 1978 (Amish et al. 1978). The Demonstration was ultimately accepted and approved by the MPCA in September 1979, with the conclusion that entrainment and impingement at Monticello offers "... no substantial detriment to the fisheries population." (Hoffman 1979).

Electrofishing surveys to assess relative abundance and seasonal distribution of fish in response to Monticello's thermal discharge have been conducted from 1976 to the present. Areas of the river sampled extend about 1.5 kilometers both up and downstream from the discharge structure, with the thermal plume generally covering less than one-half of the downstream flow of the study area. Results show similar, persistent, and stable species assemblages both up and downstream of the discharge (NSP 2004). Based on these facts, we conclude that power uprate will not affect the impingement and entrainment of organisms and will not cause effects that have not been previously evaluated.

4.2.5 Radioactive Releases (Minn. R. 7449.0320(G))

The uprate project will not result in any significant increase in radioactive releases.

The uprate will not introduce any new or different radiological release pathways and the uprate will not result in radiological levels above the safe thresholds established by the NRC and in the Technical Specifications for the plant. The uprate project will increase the number of fuel assemblies to be handled at each refueling (from 150 to an average of about 173 per refueling), but this change will not increase the probability of an operator error or equipment malfunction that would result in an uncontrolled radioactive release.

The radioactive waste systems at Monticello are designed to collect, process, and dispose of radioactive wastes in a controlled and safe manner. The design bases for these systems during normal operation is to limit discharges in accordance with 10 CFR 20 and to satisfy the design objectives of Appendix I to 10 CFR 50. These limits and objectives will continue to be adhered to after the power uprate.

4.2.5.1 Gaseous Wastes

During normal operation, radioactive gaseous effluents are released through the Reactor Building Ventilation System and the Offgas System pathways. These effluents include small quantities of noble gases, halogens, particulates, and tritium. The effluent radioactivity, in curies, of noble gases, iodine, and particulates discharged from the Monticello plant has been reduced steadily over the year and are significantly below discharges during initial operating conditions. Power uprate is expected to increase the production and activity of gaseous effluents approximately 13%. Even with the projected 13% increase, the levels of effluent radioactivity, in curies, of noble gases, iodine and particulates discharged from the Monticello plant will remain well within the guidelines of 10 CFR 50 Appendix I and the limits of 10 CFR 20 for all airborne radioactive nuclides.

4.2.5.2 Radiation Levels and Offsite Dose

4.2.5.2.1 Operating and Shutdown In-Plant Radiation

The in-plant refueling cycle average dose at Monticello has decreased at an average annual rate of 10 percent from cycle 18 refueling to cycle 23. Power uprate will involve increases in radiation levels. Dose reduction programs will continue to address the increases in individual doses due to the power uprate project.

Monticello was conservatively designed with respect to shielding and radiation sources. In the shielding analysis, the analytical assumptions for reactor water fission product concentrations and corrosion products are 8 μCi/cc and 0.07 μCi/cc respectively. The plant's administrative limit on total reactor water gamma and alpha activity for fission products and corrosion products is 0.5 μCi/cc.

Table 4-3 below summarizes the exposure history for Monticello from 1990 through 2006.

Table 4-3 Exposure History from 2006 ALARA Report (REM)

	Total	Goal	RFO	RFO Goal	Operation
1990	94	100	0	0	94
1991	465	340	371	n/a	94
1992	114	117	0	0	114
1993	496	550	429	340	66
1994	395	450	321	365	78
1995	44	80	0	0	44
1996	240	300	169	250	71
1997	106	115	0	0	106
1998	209	250	162	190	47
1999	70	60	0	0	70
2000	216	240	176	190	40
2001	221	200	166	160	55
2002	40	40	0	0	40
2003	169	161	120	121	49
2004	35	39	0	0	35
2005	175	175	149	138	26
2006	33	40	0	0	33

The plant radiation protection program will be used to maintain individual doses consistent with As Low As Reasonably Achievable ("ALARA") policies and well below the established limits of 10 CFR 20. Routine plant radiation surveys required by the radiation protection program will identify increased radiation levels in accessible areas of the plant and radiation zone postings will be adjusted if necessary. Time within radiation areas is controlled under the radiation protection program. Administrative dose control limits are established well below regulatory criteria and provide significant margin to that allowed by regulatory dose limits. Administrative dose limits are not routinely exceeded under present power conditions.

4.2.5.2.2 Offsite Doses

The Monticello project is expected to increase the production and activity of gaseous effluents by approximately 13 percent. The increase in activity levels is generally proportional to the percentage increase in core thermal power. This slight increase does not affect the large margin to the offsite dose limits established by 10 CFR 20. Monticello is committed to being a zero liquid radioactive effluent release plant. Doses from liquid radioactive effluents were currently zero in 2006 and should remain zero after power uprate implementation.

The Monticello Technical Specifications implement the guidelines of 10 CFR 50 Appendix I, which are well within the 10 CFR 20 limits. Table 4-4 contains the results of the offsite dose assessment for 2001-2006. An increase of 13 percent remains a very small fraction of the reporting limits.

Table 4-4
Offsite Radiation Dose Assessments from 2001 through 2006

Source: Annual Radioactive Effluent Release Reports for MNGP	10 CFR 50 Appendix I Limits								10 CFR 20		
	10	20	15	5	15	15	3	10	100		
	Gaseous Releases						Liquid Releases		Gaseous Releases		
	Max Site Boundary Gamma		Organ	Maximum Dose to Most Likely Exposed Member of General Public			Max Offsite Dose		Max Dose to Individuals due to Activities Inside Site Boundary		
	Gamma	Beta		Whole Body	Skin	Thyroid	Whole Body	Organ	Whole Body	Thyroid	Max Organ (Skin)
	mrad/yr	mrad/yr	mrem/yr	mrem/yr	mrem/yr	mrem/yr	mrem	mrem	mrem	mrem	mrem
2001	3.00E-03	4.00E-03	1.10E-02	6.00E-03	7.00E-03	1.10E-02	1.61E-05	1.72E-04	1.20E-02	1.40E-02	1.50E-02
2002	1.00E-03	2.00E-03	1.40E-02	6.00E-03	8.00E-03	1.40E-02	0.00E+00	0.00E+00	1.40E-02	1.80E-02	1.60E-02
2003	2.20E-02	1.70E-02	4.70E-02	3.90E-02	7.30E-02	4.70E-02	2.45E-07	5.55E-07	2.00E-02	3.00E-02	3.00E-02
2004	1.30E-02	1.00E-02	3.70E-02	2.20E-02	3.70E-02	3.70E-02	1.94E-10	1.94E-10	9.00E-03	1.10E-02	9.00E-03
2005	3.00E-03	3.00E-03	2.50E-02	1.60E-02	2.50E-02	2.50E-02	0.00E+00	0.00E+00	1.50E-02	1.60E-02	1.90E-02
2006	1.00E-03	1.00E-03	1.40E-02	8.00E-03	6.00E-03	9.00E-03	0.00E+00	0.00E+00	8.00E-03	8.00E-03	1.00E-02
Averages	7.17E-03	6.17E-03	2.47E-02	1.62E-02	2.60E-02	2.38E-02	2.72E-06	2.88E-05	1.30E-02	1.62E-02	1.65E-02

4.2.6 Radioactive Wastes

All of the radioactive waste systems at Monticello are designed to collect, process, and dispose of radioactive wastes in a controlled and safe manner. The design bases for these systems during normal operation limit discharges in accordance with 10 CFR 20 and to satisfy the design objectives of Appendix I to 10 CFR 50. These limits and objectives will continue to be adhered to after power uprate. The uprate will not result in any changes in the operation or design of equipment of the solid and liquid waste systems; the safety and reliability of those systems is unaffected.

4.2.6.1 Radioactive Solid Wastes

Monticello continually tracks the volume of radioactive solid waste ("radwaste") generated on-site. Significant volume reductions have occurred in past years making Monticello a recognized industry leader in waste reduction. For calendar years 1994 and 1995, the low-level solid radwaste volume at Monticello was 48 and 49 cubic meters respectively. This is well below the U. S. BWR Industry Median Volume of Low-Level Solid Radwaste of 178 cubic meters in 1994 and 107 cubic meters in 1995. For calendar years 2001 through 2006, the average volume of solid radwaste (spent resin, filter sludge, evaporator bottoms, etc.) shipped per year was less than 20 cubic meters. The increased volume of resins due to power uprate (estimated at 3 cubic meters/year) could be accommodated in one additional truck shipment per year.

The bulk volume of total solid radwaste shipped from Monticello (in addition to the spent resin, filter sludge, evaporator bottoms, etc.) consists of dry compacted waste, and contaminated equipment. This portion of the solid radwaste volume is not directly impacted by power uprate on an ongoing basis, but is a factor in the amount and types of housekeeping, maintenance and modification activities performed in the plant. There will likely be a temporary increase in these volumes due to the modifications and equipment replacements in support of power uprate. However, Monticello procedures and practices remain committed to a goal of minimizing the volume of solid radwaste that is created and ultimately requires shipment.

Equipment wastes from operational and maintenance activities, chemical wastes, and reactor system wastes also contribute to solid waste generation. Power uprate does not significantly affect the production or type of equipment and chemical wastes. The effect of power uprate on process wastes and reactor system wastes is evaluated below.

4.2.6.1.1 Process Wastes

The power uprate will result in small increases in the process wastes generated from operation of the Reactor Water Cleanup ("RWCU") filter/demineralizers and the condensate demineralizers.

The changeout limits for the RWCU filter/demineralizers are based on differential pressure and effluent chemistry. It is expected that more frequent RWCU backwashes will occur after power uprate due to chemistry limits. Power uprate will not involve changes in RWCU flow rate or filter performance. We have estimated that the number of backwashes for RWCU would likely increase by approximately 5 backwashes per year from 24 to 29.

The changeout limits for condensate demineralizer operation are based on differential pressure and conductivity. The principal power uprate effect on the Condensate Demineralizer System is increased condensate flow. A consequent result of increased condensate flow is that the vessel differential pressure changeout limit will be reached more frequently. We have estimated that the number of backwashes for condensate demineralizer operation would likely increase from 78 to 93 backwashes per year for an increase of 15 backwashes per year.

The increases in solid wastes from the aforementioned processes will result in waste volumes increasing from 17.5 cubic meters/year to approximately 20.6 cubic meters/year, an increase of approximately 3 cubic meters/year.

4.2.6.1.2 Liquid Radioactive Waste

Although we are authorized to discharge liquid radioactive waste (radwaste) at Monticello per the FES and the Technical Specifications, we have administratively operated Monticello as a zero radioactive liquid

release plant since 1972. No change is expected in the zero release policy as a result of power uprate.

The annual liquid volume processed by the Liquid Radwaste System is estimated to increase from approximately 11,000 gals/day to 11,250 gals/day due to the increased frequency of RWCU filter/demineralizer and condensate demineralizer backwashes as a result of power uprate. This increased frequency is estimated to add approximately 91,000 gallons/year, or about 250 gals/day. This increase is less than 2 percent of overall system capacity and brings the total usage to about 55 percent of system capacity. Because of the zero liquid radwaste discharge policy at Monticello, this slight increase in input to the liquid radwaste system will be recycled, not discharged, and therefore will not produce any environmental impact. The amount of solid radioactive wastes resulting from the recycling of the liquid wastes is already captured in the 3 cubic meter increase reported in Section 4.2.6.1.1 Process Wastes above.

The power uprate project will not result in significant increases in the volume of fluid from other sources to the Liquid Radwaste System. The reactor will continue to be operated within its present pressure control band. Valve packing leakage volume into the liquid radwaste system is not expected to increase. There will be no changes in reactor recirculation pump seal flow or any other normal equipment drain path. In addition, there will be no impact to the Dirty Radwaste, Chemical Waste, or Laundry Waste subsystems of the Liquid Radwaste System since the operating modes and the inputs to these subsystems are independent of power uprate.

Power uprate will not affect compliance with the limits of 10 CFR 20 or the guidelines of Appendix I to 10 CFR 50 for liquid effluents at Monticello.

4.2.6.1.3 Reactor System Wastes

Reactor system wastes will increase slightly (less than 1 additional shipment over the remaining life of the plant) due to operation at power uprate conditions. This one additional shipment represents a 13 percent increase in these wastes and includes items such as control rods and local range power monitor components. These wastes are currently stored in

the spent fuel pool and will not be shipped offsite until plant decommissioning.

An Independent Spent Fuel Storage Installation ("ISFSI") is currently being constructed at Monticello and spent fuel will begin being stored there in 2008. After power uprate implementation, the number of irradiated fuel assemblies discharged from the reactor will increase from a nominal 150 assemblies/cycle to an average of approximately 173 assemblies/cycle. These additional assemblies will be stored in the existing spent fuel pool and ISFSI facility. If a federal repository is not accepting spent fuel by 2025, an additional three dry-storage canisters may be necessary to continue operation until the end of Monticello's operating license.

The annual environmental impact of low and high level solid wastes has been generically evaluated by the NRC Staff for a 1,000 MW reference reactor. The estimated activity content of these wastes is given by Table S-3 in 10 CFR 51.52 and is bounding for Monticello after power uprate implementation.

Given the arguments above, we believe the environmental impact due to generation of solid radwaste from the power uprate project is insignificant.

4.2.7 Non-Radioactive Solid Wastes (7849.0320(H))

Construction activities associated with the power uprate will generate non-radioactive solid wastes. The volume will be comparable to the waste generated during a typical refueling/maintenance outage. No ongoing non-radioactive solid wastes will be generated due to power uprate.

4.2.8 Noise (7849.0320(I))

The power uprate project will not result in any significant changes to the character, sources, or energy of noise generated at Monticello. The new equipment necessary to implement the uprate project will be primarily installed within existing plant buildings. No significant increases in ambient noise levels are expected within the plant. This includes the upgraded high-pressure turbine, which will operate at the same speed as

the original equipment. The effect of the additional period of cooling tower operation on ambient noise levels is not significant. No new significant noise-generating equipment will be installed outside the plant.

4.2.9 Workforce (7849.0320(J))

Construction activities for the uprate project are expected to occur primarily during refueling outages in the first quarter of 2009 and 2011. The size of the workforce during the two refueling outages when power uprate is implemented is not expected to change significantly from the size of the workforce during a normal refueling outage.[14] There is no impact from power uprate on the size of Monticello's workforce during periods of normal operation.

4.2.10 Transmission Facilities (7849.0329(K))

Property located outside the inner security fence will not be modified or changed. The uprate will require a new 13.8 KV bus and new two new transformers will be installed at the plant to assure the reliability of the onsite auxiliary electrical distribution system. The power uprate will utilize the existing transmission system in the area, thus there is no known impact on the environment due to new transmission at this time.

A feasibility study for the Monticello power uprate was performed in a manner consistent with the Mid-Continent Area Power Pool (MAPP) Design Review Standards (DRS) and Midwest Independent System Operator (MISO) practices for interconnection and transmission studies. The results of this study indicate that transmission system improvement *may* be required to support the uprate project. The study acknowledges that the results may change depending on which generation projects (and corresponding transmission improvements) listed in the MISO interconnection queue ahead of the Monticello uprate project actually progress to construction. This feasibility study does not take the place of the System Impact Study (SIS) effort to be performed by MISO under the Large Generation Interconnection Process (LGIP), which will ultimately determine the required changes to the transmission system, if any, to support the increased generation from the project.

[14] Power uprate may result in a few dozen additional employees on-site during refueling; however this is a insignificant amount in relation to the approximately 500 additional personnel who will be on-site for the refueling.

Table 4-5: Monticello Environmental Summary

Rule Reference	Description	Monticello Power Uprate Project
7849.320 A	Land Requirements	No increased land usage
7849.320 B	Traffic	No increased levels during construction or normal operation
7849.320 E (1)	Water Use Maximum	No increase above permitted levels
7849.320 E (1)	Max. Pumping Rate	6 existing ground water wells • 2 - 100 gpm pumps • 2 - 45 gpm pumps • 1 - 10 gpm pump • 1 - 22 gpm pump No new wells or increase from existing wells required
7849.320 E (1)	Annual Appropriation	Increase surface water appropriations by approximately between 900 and 1,900 acre ft/year. The increased use is within the limits of the current surface water permit.
7849.320 E (1)	Annual Consumption	Assuming an increase in open cycle consumption of 20% is required for the proposed power uprate, an increase in days of cooling tower operation to 150 days/year, and nominal values of cooling tower flow, the estimated consumption would be 7,700 acre-ft/year.
7849.320 H	Non-Radioactive Solid Wastes Produced	• Construction activities associated with the power uprate will generate non-radioactive waste. • The volume will be comparable to the waste generated during a typical refueling/maintenance outage. • No ongoing non-radioactive solid wastes will be generated due to power uprate.

Rule Reference	Description	Monticello Power Uprate Project
7849.320 I	Noise	Power uprate does not result in any significant changes to the character, sources, or energy of noise generated at Monticello.
7849.320 J	Work Force	No significant change to the size of workforce normally utilized at Monticello during construction or normal operation.
7849.320 K	Transmission Requirements	No know impact on the environment due to transmission at this time.
	Heat Rejected (through exhaust gas of each turbine at base load)	

5 Denial Would Adversely Affect Adequacy, Reliability, and Efficiency of Energy Supply System

The Commission must determine that four principal criteria are met when granting a Certificate of Need (Minn. R. 7849.0120). Our Application for approval of the Monticello uprate project meets all four principal criteria. This section addresses the first criterion (Subpart A) that:

"the probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states."

Xcel Energy is one of the primary electrical systems serving Minnesota and neighboring states. Our 2004 Resource Plan identified a 1,125 MW deficit in 2015. That deficit was reduced in part due to increased demand-side management ("DSM") and the identification of approximately 320 MW of upgrades to the Monticello, Prairie Island and Sherco generating plants.

As previously noted in Chapter 1, our 2007 Resource Plan establishes that we have a deficit starting in 2010 that steadily grows to over 2,800 MW by 2022. The increased MW from the Monticello uprate project helps us fill the deficit by providing highly reliable capacity and low-cost, carbon free energy for many years. Our 2007 Resource Plan also identifies a need for 3,800 MW of natural gas intermediate and peaking resources over the planning horizon.[15] All of these needs were identified after assuming we would add 2,600 MW of wind resources by 2020 to comply with the RES statute and in addition to an increase from our current level of DSM savings of .8 percent to 1.1 percent of retail sales due to the passage of the Next Generation Energy Act of 2007.

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[15] The expansion plan resulting from the reference case. It does not consider identified uprates/upgrades or life extension of Manitoba Hydro contract.

Approval of the Monticello power uprate project will result in a more adequate, reliable and efficient energy supply for our customers, the people of Minnesota and those in neighboring states. Even with the increased commitment to DSM and wind energy due to the legislation, our system is growing and we need additional resources. By gaining additional MW from an existing carbon free generation source, we can meet our customers' growing energy needs at a reasonable cost while keeping us on the path to achieve the 30 percent carbon reduction goal by 2025 also established in the Next Generation Energy Act of 2007.

Denying this CON would increase the probability of inadequate regional generation capability, reduce the reliability of our system, and negatively affect the Company's ability to comply with statutory and regulatory requirements of the Next Generation Energy Act of 2007.

5.1 Xcel Energy Forecasting and System Planning

The Company plans and operates our five-state northern service territory on a system-wide basis. The forecast used to determine the "system's" resource needs includes our customers' needs in Michigan, Minnesota, North Dakota, South Dakota and Wisconsin. In determining those needs, we forecast the number of customers and MWh sales by customer class for each of the five-state jurisdictions separately and then aggregate them. The use of a five-state system forecast is appropriate for planning purposes and is consistent with the forecast approved in the 2004 Resource Plan and previous Certificates of Need.

Minn. R. 7849.0270, subp. 2(A) requires data on the annual electric consumption of *Minnesota* customers (emphasis added). A forecast of only Minnesota customers' needs is of little value for system planning purposes. Therefore, the growth of our system depicted in this chapter is the five-state system forecast.[16]

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[16] Minn. R. 7849.0270, subp. 2 (A) and subp.. 3 and Minn. R. 7849.0270 subp. 3(D) require the submittal of the statistical tests for the forecast used. Since Xcel Energy forecasts peak demand and energy for the five-state system by customer class for each state jurisdiction, the data is voluminous (>1,000 pages). Therefore, we have not included the information required by Minn. R. 7849.0270 subp. 3(D) with this application, but will provide it on CD upon receiving an information request from the Department of Commerce. We will supply copies to other parties as requested.

5.2 Demand and Energy Forecasts are Increasing

5.2.1 Current Peak Demand and Energy Forecast

Our most recent forecast of peak demand for electrical power from customers in our five-state upper Midwest system is shown in Figure 5-1. Consistent with the previous forecast approved in the 2004 Resource Plan, we anticipate that the demand for electrical power will continue to grow in the future. The base demand forecast in Figure 5-1 has not been adjusted for our very successful load management programs. The net forecast reflects our anticipated peak after adjusting for the load management programs.

We currently project energy growth of 1.1 percent or 556 GWH per year and demand growth of 1.2 percent or approximately 133 MW per year[17]. The energy and demand forecasts incorporate a methodology change involving our accounting for DSM savings versus previous forecasts filed. In the past, embedded DSM from past programs was included in the forecast, but the forecasts did not incorporate estimated saving from future DSM programs. In the determination of this forecast, we now include an estimate of future DSM savings. The effect of this methodology change can be seen in comparing the graphs in Figures 5-3 and 5-4. The methodology used to develop the forecast demand and energy and other forecast details required by Minnesota Rule 7849.0270 are provided in Appendix B: Xcel Energy System Demand and Capability Data.

The projected demand growth after complying with the DSM and RES requirements will result in a deficit of 126 MW in 2010 that grows to 2,886 MW by 2022 (Table 5-1). The Monticello power uprate provides the needed capacity in the most economic manner and also provides significant benefits towards carbon reduction by displacing energy from existing fossil fuel sources with carbon-free energy going forward.

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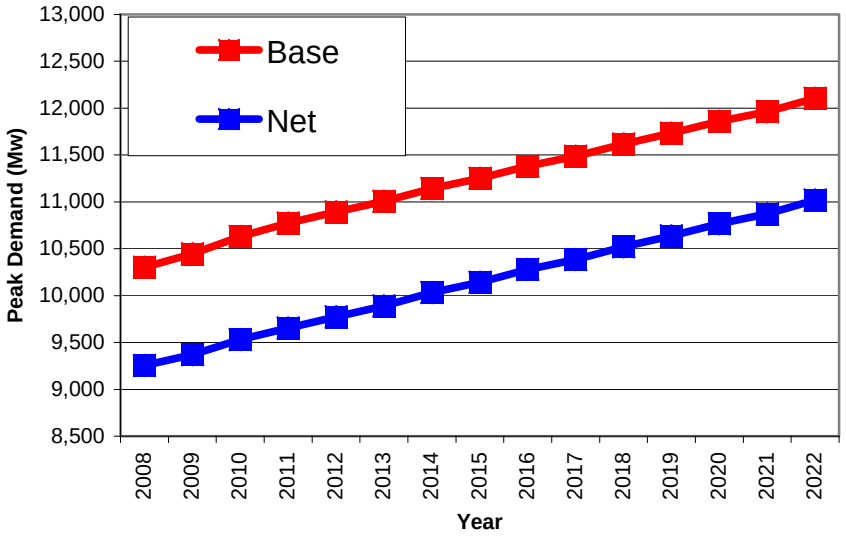
[17] Base energy growth is based on the 50 percent forecast and base demand growth is based on the 90 percent forecast. The data depicted in Figure 5-1 is the 90th percentile Base (uninterrupted) and Net (interrupted) Peak Demand forecast.

Table 5-1: Surplus/(Deficit) Projections

Year	MW
2008	102
2009	83
2010	(126)
2011	(75)
2012	(228)
2013	(395)
2014	(597)
2015	(1,195)
2016	(1,779)
2017	(1,877)
2018	(2,038)
2019	(2,220)
2020	(2,353)
2021	(2,503)
2022	(2,886)

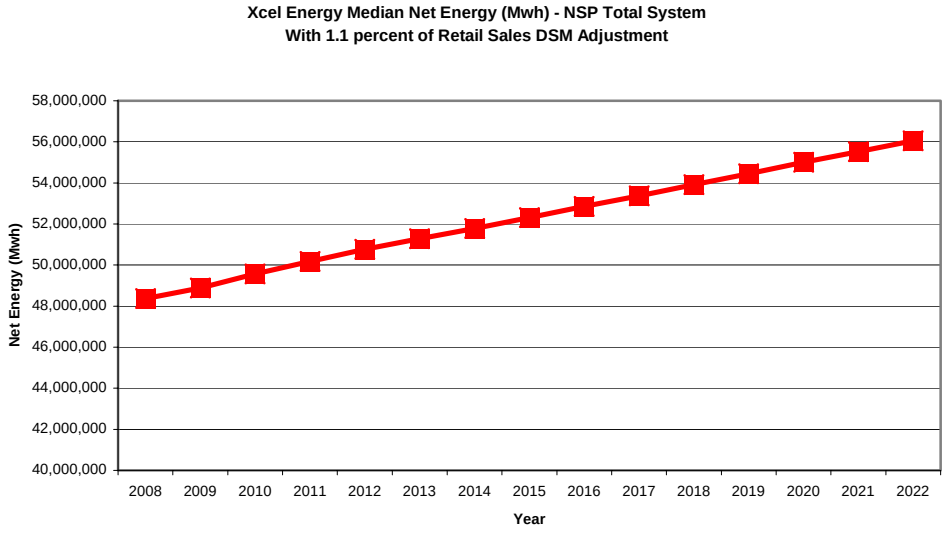
Figure 5-1:
Xcel Energy 90th Percentile Base and Net Summer Peak Demand (MW)
NSP Total System - With 1.1% of Retail Sales DSM Adjustment



As seen in Figure 5-2, like the increasing demand forecast, the energy forecast is also growing. After accounting for DSM, the energy

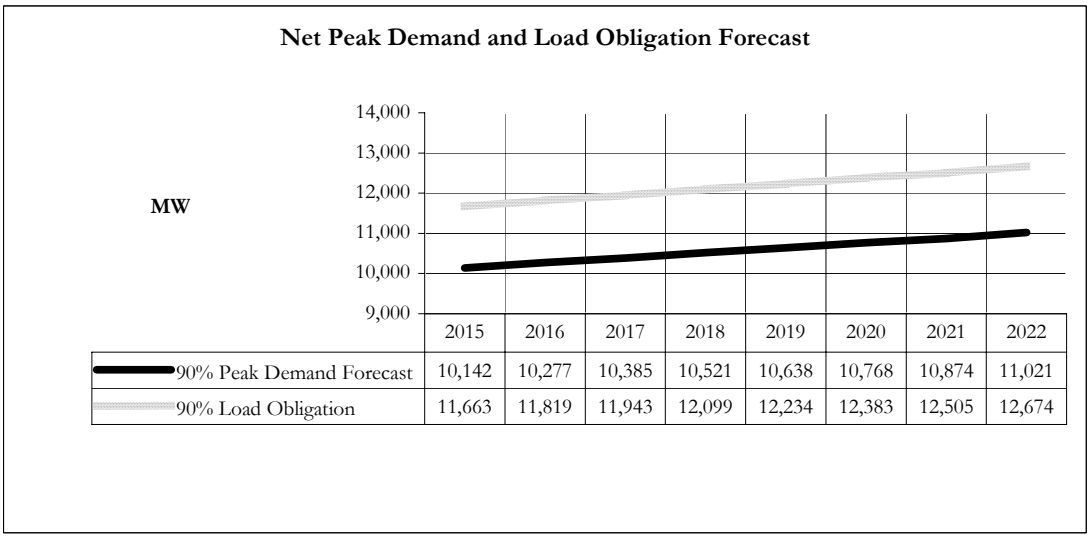
forecast grows at an average rate of 1.1 percent. This 1.1 percent annual growth rate equates to an average annual growth of 556 GWh per year on our five-state system.

Figure 5-2: Native Energy Requirements Forecast



In order to determine the generation needed to serve our load determined in Figure 5-1 and meet the MAPP reserve capacity obligations, a 15 percent reserve margin must be added. (Figure 5-3.)

Figure 5-3: Net Peak Demand and Load Obligation



	2015	2016	2017	2018	2019	2020	2021	2022
90% Peak Demand Forecast	10,142	10,277	10,385	10,521	10,638	10,768	10,874	11,021
90% Load Obligation	11,663	11,819	11,943	12,099	12,234	12,383	12,505	12,674

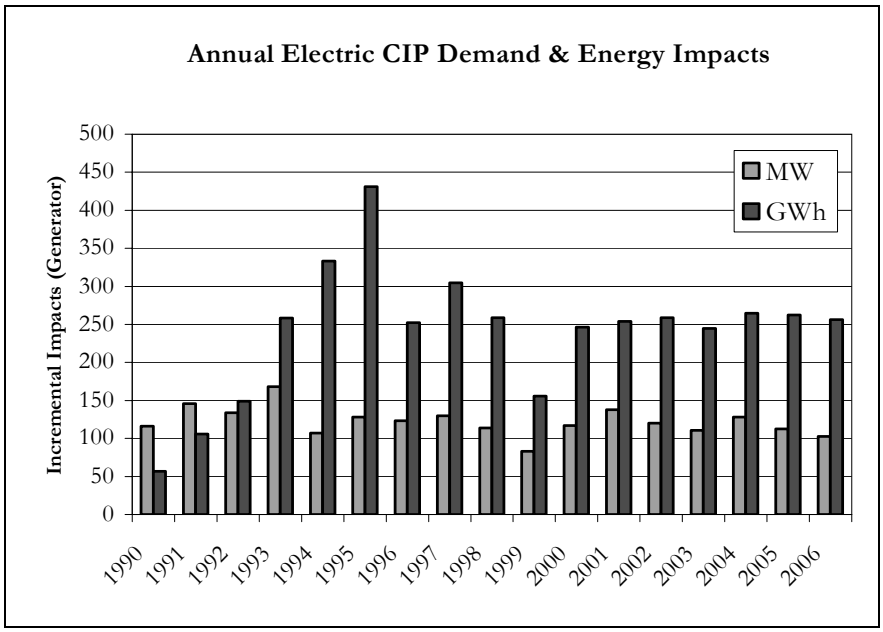
The solid black line in Figure 5-3 illustrates the peak demand level that is likely to be exceeded 10 percent of the time. The black line includes embedded DSM from past programs and future savings estimates from conservation and load management programs. The dashed line is the amount of generation that will be necessary to meet the forecasted demand plus a 15 percent reserve margin.

5.2.2 Forecasts Rely on Continued Aggressive DSM

Our forecasted demand is not growing as a result of promotional activities to sell electricity. We do not have programs promoting the sale of electricity: We have programs that promote the conservation of electricity. The forecast information presented in this section already takes into account the aggressive peak demand and energy savings goals set in our 2007/2008/2009 CIP Triennial Plan for 2008 and 2009, as well as assumes we achieve a 1.1 percent reduction in sales from DSM in 2010 and beyond consistent with the Next Generation Energy Act of 2007.

In order to meet our demand-side management goals, we devote significant resources to our DSM programs, resulting in some of the most significant DSM achievements in the United States. Between 1990 and 2006 in Minnesota, we have achieved nearly 4,100 GWh of energy savings and 2,100 MW of peak demand savings due to our demand-side management programs, as reflected in Figure 5-4. Of the 2,100 MW of peak demand savings, approximately 875 MW are controlled through our load management programs. The net peak demand line in Figure 5-3 reflects those load management capabilities.

Figure 5-4: CIP Demand and Energy Impacts



Our current demand and energy-savings goals were approved as part of our 2007-2009 Triennial Plan. Specifically, we are committed to achieving 762 GWh and 271 MW of savings between 2007 and 2009. In our Triennial Plan, we developed two new Business programs, Industrial Efficiency and Segment Efficiency (focused on Commercial Real Estate), as well as one new Residential program, the Home Performance Pilot. Including these three new programs, the Company proposed the goals found in Table 5-2 for our 2007-2009 CIP Triennial Plan. We will continue to evaluate our existing programs and look for ways to better serve customer markets in order to meet the aggressive requirements of the Next Generation Energy Act of 2007.

Table 5-2: DSM Goals as Approved in 2007/2008/2009 CIP Triennial Plan*

	2007	2008	2009	Total
Budget	$45,504,799	$47,002,224	$48,350,183	$140,857,206
Generator kW	87,300	90,980	92,809	271,089
Generator kWh	238,213,749	259,635,189	264,114,597	761,963,535

* Please note that these goals were proposed in the Company's CIP Triennial Plan Errata, filed September 13, 2006 in Docket No. E,G002/CIP-06-80 and approved by the Department on November 29, 2006.

Figures 5-6 and 5-7 indicate the Company's historical commitment to achieving and exceeding its DSM goals. The Company fully expects to meet its CIP energy and demand savings goals in future years.

Figure 5-6: CIP Electric Energy Savings, 2000-2009[18]

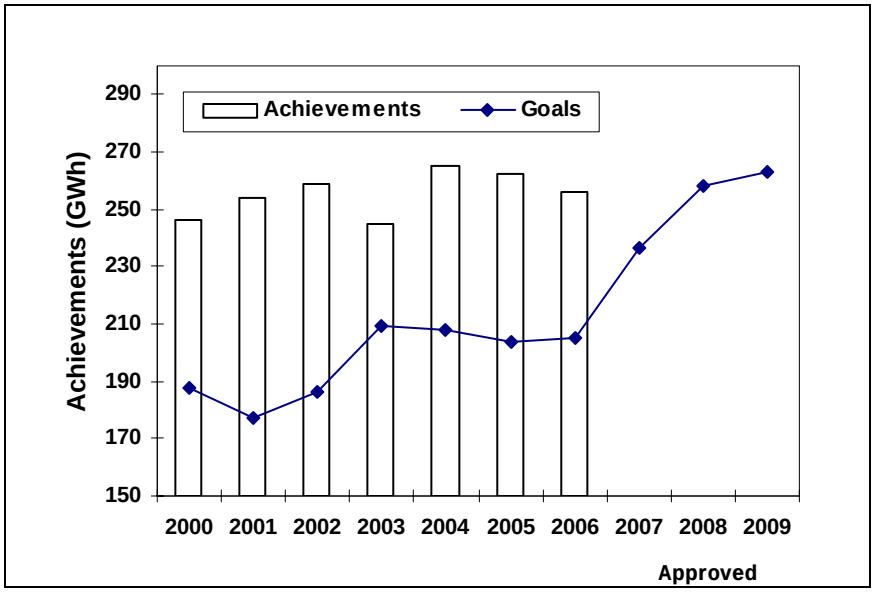
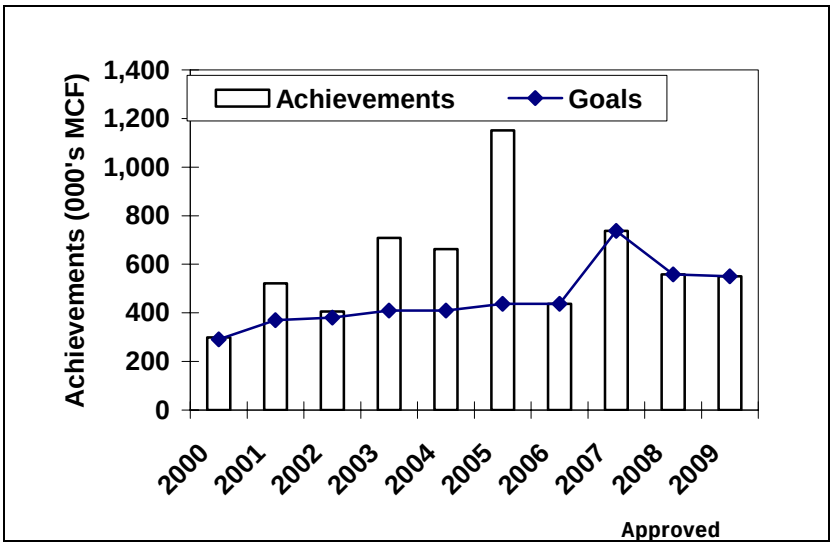


Figure 5-7: CIP Electric Demand Savings, 2000-2009[19]



Additional detail on our conservation and load management programs is presented in Appendix C.

[18] 2007 Energy saving were not available at time of printing.

[19] 2007 Demand savings were not available at time of print.

5.2.3 Demand and Energy Obligations Include MAPP Reserve Capacity Obligation

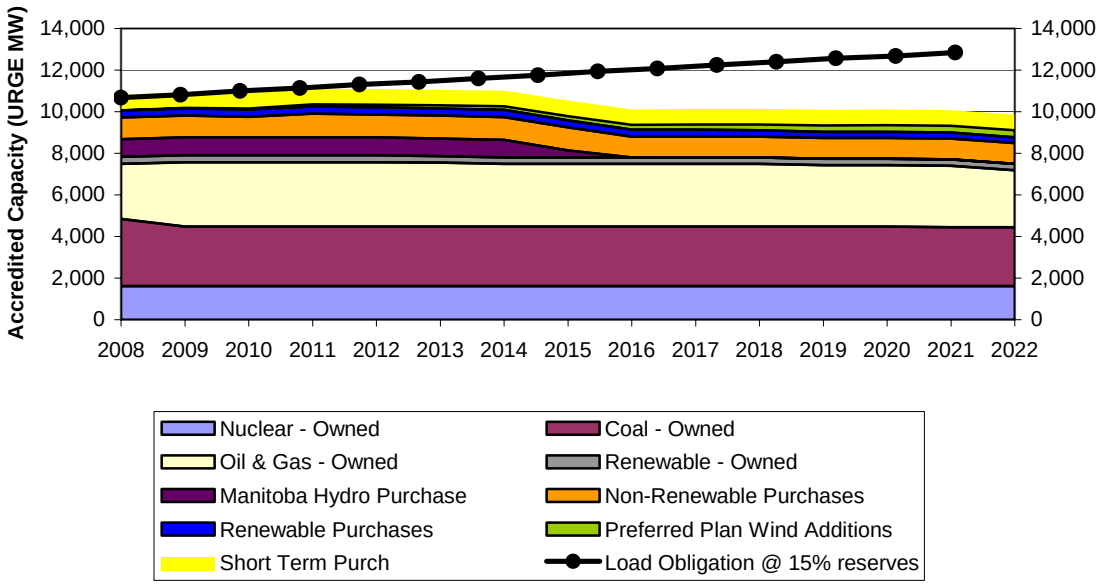
The Company is obligated as a member of the MAPP to provide a 15 percent reserve margin, so that adequate backup resources are available to all MAPP members in the event of critical equipment failures on the regional system. In this way, upper midwest power suppliers pool together to ensure the reliability of service to their customers. By pooling resources, total production capacity reserve can actually be reduced. Without the 15 percent reserve commitment from all power suppliers, each company would have to provide a higher level of backup resources to ensure the equivalent reliability of its own system. The dotted line on Figure 5-7 reflects the 15 percent reserve capacity obligation, calculated after conservation and load management forecasts are applied to the peak demand forecast (solid line).

5.2.4 Meeting Customers' Energy Needs

We meet our customers' needs for electricity with a combination of Company-owned-and-operated generating facilities, and long- and short-term power purchases. To ensure that the actual demand and associated MAPP capacity reserve requirements can be met, we plan our generation supply to meet the 90 percent forecast probability level. Notwithstanding MAPP requirements to maintain a 15 percent reserve margin, we are required under Minnesota Statute § 216B.04 to supply safe, adequate and reasonable electric service to all customers in our exclusive service territory. The assumption to plan capacity to the 90 percent probability was based on the decreasing availability of capacity reserves in the region and the increasing constraints on the transmission system seen in recent years. The change to using the 90 percent probability for capacity planning is further explained in Chapter 3 of our 2007 Resource Plan.

Our most recent forecast of available resources is illustrated in Figure 5-7.

Figure 5-7: Requirements and Resources



5.2.5 Compliance

Our obligation is to provide sufficient resources to meet our customers' growing energy needs while complying with the requirements of the Next Generation Energy Act of 2007 and the Commission's Order to pursue the uprates from our 2004 Resource Plan. The Company is committed to achieving the increased DSM goals. However, doing so will still require us to add a significant amount of additional generation. Pursuing the Monticello power uprate and the upgrades at some of our other existing plants (Prairie Island and Sherco) will help us meet our customers' growing needs.

However, as we determine how best to meet the increased generation needs of our customers, we must do so in a manner that also furthers our compliance with the legislature's 30 percent carbon reduction goal by 2025. The Monticello uprate project provides a unique opportunity to add low-cost capacity and energy to meet our customers' growing needs while furthering our compliance with the

Commission's Order and meet the carbon reduction goal established by the legislature.

5.3 Consequences of Project Delay

Due to the nature of nuclear power production and the importance of Monticello to the system, the only time the construction for the uprate can take place is during a refueling outage. Refueling outages are scheduled approximately every 22 to 24 months at the Monticello plant. The next two outages for Monticello are scheduled for March of 2009 and spring of 2011. Detailed outage construction and refueling schedules are determined years in advance of an outage to minimize plant down time. Minimizing plant down time minimizes the cost of replacement power. Delaying this schedule would significantly affect the maintenance and refueling analysis already performed and planned. Since the operating license extends until 2030, project delay would also decrease the number of years the project would provide benefits to customers by shortening the number of years we would receive the additional energy and capacity from the project. During the delay period, customers would not benefit from the availability of the lower cost energy and the environment would not benefit from the operation of a carbon-free base load facility for that period.

Denial of the Monticello uprate project will have an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to our customers and the region. Additional capacity is required on our system starting in 2010 and the deficit grows steadily. The additional capacity of a highly reliable base load facility complements the significant amount of wind to be added to the system. The low-cost carbon free energy from Monticello replaces energy from existing natural gas-fired generation, freeing them up to dispatch as necessary to complement the wind.

6 An Examination of Alternatives: Project is Most Reasonable and Prudent Alternative

A Certificate of Need must be granted to an applicant upon determining that four principal criteria are met (Minn. R. 7849.0120). This section addresses the second criterion (Subpart B) that:

"a more reasonable and prudent alternative to the proposed facility has not been demonstrated by preponderance of the evidence on the record."

In order to examine the reasonableness of the Monticello uprates, we compared the project to alternatives using multiple criteria. The results of this analysis show that the power uprate is the best alternative for meeting the identified need. The Monticello power uprate project is a unique opportunity for us to acquire additional low-cost, carbon-free base load energy from an existing plant.

Specifically, the evaluation criteria were:

- Cost — The cost of the power uprate is lower than other available alternatives considered. In addition, the costs for the Monticello power uprate project are more certain and involve less risk than other projects.

- Environmental Impacts — The Monticello project will reduce carbon emissions. As a non-carbon producing generation source, it is superior to fossil fuel alternatives that emit carbon. And, since the power uprate project is a low-cost energy resource, it is dispatched prior to other fossil fuels plants. This results in a *reduction* of carbon. In addition, upgrades/uprates to existing power plant sites eliminate the need to develop greenfield sites for new plants.

- Reliability — Monticello has set records for reliability. The plant has a 5-year average capacity factor of 94.2 percent and the uprated facility is expected to continue this level of performance.

- Appropriateness — The 71 MW power uprate project at Monticello is the appropriate size, type, and timing based on our identified resource need. The uprate will be phased in over two refueling cycles in 2009 and 2011, just as we show a generation deficit starting in 2010.

This section will demonstrate that the Monticello project is more economical, more reliable and more environmentally acceptable than the other options considered.

6.1 Alternatives Evaluation Methodology

The alternatives evaluation for this generating resource followed a multi-step process.

First, we performed a qualitative screening to identify alternatives that have similar energy and capacity characteristics to the Monticello project. Alternatives that were not reasonably applicable to the need or that were deemed to be excessively risky or costly were screened out from further consideration. The candidate alternatives were organized into three groups. The first group is the plant alternatives that do not rely on the construction of a new central power generation facility (Figure 6-1). The second group consists of fossil fuel options Figure 6-2). The third group consists of renewables and emerging technologies (Figures 6-3 and 6-4). From the qualitative screening, we selected options to model in Strategist for a more thorough quantitative assessment and compare them against the Monticello project. In addition to the options identified in the qualitative screening, we performed an "unconstrained" analysis in Strategist. An unconstrained analysis allows Strategist to pick the best generic resource available based on capacity price and energy cost.

We modeled the various alternatives under different assumptions regarding fuel, environmental and capital costs. The resulting total system costs and emission levels were compared to evaluate the alternatives for cost-effectiveness and environmental impacts.

6.2 Alternative Approach Screening

The Certificate of Need Rules require that the applicant evaluate several alternative approaches to meeting the need that do not rely on the construction of a new central power station. The Company examined the following types of alternative approaches:

- Demand-Side Management
- Increased Efficiency of Existing Facilities
- Long Term Purchased Power
- Short Term Purchased Power
- New Transmission Lines
- Distributed Generation
- Reduced Project Size
- No Facility

Each alternative approach that was reasonably able to meet the stated project goals was examined in more detail in the next step of the evaluation.

6.2.1 Demand-Side Management

DSM includes our conservation and load management programs, which are presented in detail in Appendix C. The Next Generation Energy Act of 2007 approximately doubled the DSM goals approved in our 2004 Resource Plan. The Act sets a mandatory minimum savings goal from Conservation Improvement Programs, or "CIP", programs at 1.0 percent and an overall conservation goal of 1.5 percent.

We are committed to achieving a 1.1 percent energy reduction as our CIP/DSM goal. Meeting this goal will be very challenging. We will likely launch new conservation programs as well as expand existing programs to meet the 1.1 percent target. Such aggressive expansion of DSM programs pushes the limits of achievable potential in our service territory and creates significant uncertainty regarding the size and timing of actual savings. Until we have implemented our plan to meet the 1.1 percent target and gained some experience operating a significantly larger DSM portfolio, it is unreasonably risky to rely on increased DSM in order to replace the energy and capacity from the Monticello uprate project. If the DSM alternative was selected and the company failed to achieve the necessary savings, we would be forced to buy replacement capacity and energy from the market.

Therefore, the Company concludes that additional DSM saving beyond our target of 1.1 percent is not a feasible alternative to the power uprate project.

6.2.2 Increased Efficiency of Existing Facilities

The Company has identified and is also pursuing uprate/upgrade projects for its existing Prairie Island and Sherco generation plants and has incorporated estimates of these projects in our recently filed resource plan. Our next three largest plants King, Riverside, and High Bridge are all part of our Metro Emission Reduction Program ("MERP") and are undergoing significant modifications to reduce their emissions and increase their electrical output. This leaves few opportunities for additional efficiency projects and therefore increased efficiencies at existing plants were not considered further.

6.2.3 Long-Term Purchased Power

Long-term purchased power agreements have historically been an important part of our resource mix. We are unaware of a specific long-term purchase opportunity, but we did model an estimate of a long term PPA from a coal-based resource to include as a possible alternative. The hypothetical coal PPA price was modeled to have the same cost, performance, and emission characteristics of a new conventional coal plant. The PPA may have similar capacity and

energy characteristics to the uprate and therefore was selected for inclusion in the quantitative evaluation using the Strategist model.

6.2.4 Short-Term Purchased Power

Historically, we have depended on short-term power purchases to cover about the last 5 to 10 percent of our projected capacity and energy needs. While there are some concerns about firm transmission service and about the continued recognition of MISO Network Transmission service being approved for accreditation of resources by MAPP, we believe the same level of short-term power purchases can be achieved for the near future.

Our resource planning process explicitly recognizes the level of short-term purchases that can reliably contribute to our overall resource portfolio. (The 2007 Resource Plan incorporated 750 MW of short-term purchases.) We will continue to pursue short-term power purchases as a valuable portion of our power supply portfolio. However, our assessment is that it would be too risky to extend further into the short-term market than is already accounted for. Therefore, short-term purchases are not a prudent resource option to meet the current need.

6.2.5 New Transmission Lines

Additions to or improvements in the electric transmission system are not viable alternatives to the Monticello power uprate proposal. The underlying assumption with this alternative is that additional transmission infrastructure would provide access to additional capacity resources. However, since the capacity construction boom of the late 90's there had been relatively little capacity built in the region. The result has been very tight capacity markets with little or no excess capacity available. Thus, no opportunities exist for new transmission to bring in additional capacity. Timing is also an issue for transmission as an alternative. The planning, permitting, and construction of transmission facilities is a multi-year process. It is unlikely that additional transmission could be planned, permitted and built to import additional energy by the 2011 in-service date.

6.2.6 Distributed Generation

Pursuant to Minn. Stat. § 216B.2426, the use of distributed generation was also considered to meet the need. However, we are not aware of available distributed generation resources in the quantities that would be necessary to fill the current need. We reviewed the distributed generation information requests and analyses we performed (DOC-18 and DOC-19) in the Monticello Spent Fuel Storage Certificate of Need (Docket No. E002/CN-05-123). Our review indicated that a significant percentage of the distributed generation from those analyses was either wind or DSM. Considering the new RES and DSM legislation, once those two resources were excluded, the main source of distributed generation left to consider were biomass, biodiesel and small hydro. Based on available cost estimates these resources are not likely to be cost-effective alternative and were therefore excluded from further consideration.

Pursuant to the Commission's July 28, 2006 order in the 2004 Resource Plan, the Company has contracted with a consultant for a new study of distributed generation. This study, together with related studies initiated by the 2007 Legislature will define what a comprehensive distributed generation strategy would entail and will help identify the total potential for distributed generation within our service territory in the future.

6.2.7 Reduced Project Size

The power uprate project will provide a net capacity increase of approximately 71 MW. This is the optimal, achievable capacity increase at the Monticello facility. If any reduction in the capacity of the project were feasible it would result in higher costs per MW and not meet the identified need. Alternative smaller uprate projects were not deemed reasonable.

6.2.8 No Facility

If the power uprate project were not to be undertaken, we would experience a deficit starting in 2010 that would grow to almost 2,900 MW by 2022. Due to our requirement to provide safe, adequate and reasonable electric service pursuant to Minn. Stat. § 216B.04, "no facility" is not an option as we would experience a deficit in 2010 and beyond if the proposal or an alternative is not undertaken.

6.3 Alternatives Screening Summary

The results of the qualitative screening for alternative that are not based on central power stations are summarized in Table 6-1. Our assessment shows that a long-term power purchase agreement is the only alternative approach that might be a reasonable alternative to the Monticello power uprate.

Table 6-1
Alternative Approach Screening Summary

Does this technology have the characteristics to be a reasonable alternative? + **Likely** o **Possibly** - **Not likely**								
	Demand Side Management	**Increased Efficiency of Existing Facilities**	**Long-Term Power Purchases**	**Short –Term Power Purchases**	**New Transmission Lines**	**Distributed Generation**	**Reduced Project Size**	**No Facility[1]**
Applicability: Does this resource have characteristics similar to the Monticello Uprate Project?	**O**	**-**	**+**	**O**	**-**	**-**	**-**	**-**
Reliability: Will this resource be available as needed and provide benefits to the grid?	**-**	**-**	**+**	**-**	**-**	**O**	**-**	**-**
Is this approach feasible?	**No**	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**

[1] The No-Facility scenario allows Strategist to pick the most applicable resource from those available when it is needed. This is called the "unconstrained" scenario.

6.3.1 Generation Technology Screening

Appendix D presents detailed descriptions of the fossil fuel, renewable resource and other generation technologies screened along with a discussion of the evaluation factors for each technology. The conclusions of that screening process are discussed below.

6.3.2 Fossil Fuel Technologies Screening

Fossil fuel technologies considered in the screening include an integrated gasification combined cycle (IGCC), a coal-fired boiler, and a natural gas-fired advanced combined cycle. These units have similar operating characteristics to the Monticello project and are potentially viable alternatives. Table 6-2 summarizes the initial evaluation of each fossil fuel technology's characteristics.

Table 6-2
Characteristics of Fossil Fuel Technologies

	IGCC	Coal-Fueled Boiler	Advanced Natural Gas-Fueled Combined Cycle
Applicability: Does this resource have appropriate characteristics to meet 2011 need	-	-	-
Reliability: Will this resource be available as needed and provide benefits to the grid?	-	-	-
Is further consideration warranted?	**No**	**No**	**No**

Although the fossil fueled alternatives have similar operating characteristics, the IGCC, coal, and combined cycle units cannot be built to the appropriate 71 MW scale and none could be constructed

in time to meet the 2011 capacity need. Additionally, the advanced combined cycle is currently not a commercially viable technology.

6.3.3 Renewable Resource Technologies Screening

Renewable resource technologies considered as potential alternatives include wind, solar, biomass, hydropower, and landfill gas. Table 6-3 summarizes the initial screening of each renewable resource technology's characteristics.

Table 6-3
Initial Screening of Renewable Resource Technologies

Does this technology have the characteristics to be a reasonable alternative? + Likely o Possible - Not Likely					
	Wind	**Solar**	**Biomass**	**Hydro-power**	**Landfill Gas**
Applicability: Does this resource have appropriate characteristics to meet 2011 need?	-	-	+	o	o
Reliability: Will this resource be available as needed and provide benefits to the grid?	-	-	o	-	-
Is further consideration warranted?	**No**	**No**	**Yes**	**No**	**No**

A biomass-fueled resource may have the appropriate characteristics and reliability to fill the same need as the power uprate project and was included as an alternative for further evaluation.

6.3.4 Emerging Technologies Screening

Other technologies screened as potential alternatives include fuel cells, microturbines and several energy storage technologies. Table 6-4 summarizes the initial screening of these emerging technologies.

Table 6-4
Initial Screening of Other Technologies

Does this technology have the characteristics to be a reasonable alternative? + Likely o Possibly - Not likely			
	Fuel Cells	**Micro-Turbines**	**Stored Energy**
Applicability: Does this resource have appropriate characteristics to meet the need?	**O**	**O**	**O**
Reliability: Will this resource be available as needed and provide benefits to the grid?	**-**	**-**	**-**
Is further consideration warranted?	**No**	**No**	**No**

None of the emerging technologies warrants further consideration as an alternative to the Monticello power uprate project.

6.4 Economic and Environmental Analysis

As a result of the qualitative screening process, we identified two alternatives that have operating characteristics similar to the Monticello power uprate project; a 71 MW Biomass plant and a 71 MW long-term coal PPA. In addition, an "unconstrained" scenario was included as an alternative to the Monticello uprate project. In the unconstrained scenario we allowed Strategist to select the lowest-cost generic unit(s) available to fill the need. Strategist selected a 160 MW natural gas combustion turbine ("CT"). The CT selected and other existing resources were used to generate the equivalent energy of the Monticello power uprate. The next step was to more thoroughly evaluate the economic and environmental factors associated with each alternative through a series of modeling scenarios.

6.4.1 Modeling Tool

We used the Strategist resource expansion model[2] to analyze various long-range electric supply-demand alternatives. Strategist:

[2] "Strategist" is a registered trademark of New Energy Associates, Inc. New Energy Associates developed and maintains the Strategist model.

- Develops the optimized selection of resources to meet need, given the input assumptions.

- Calculates the present value of revenue requirements ("PVRR") to measure the economic impacts of various planning scenarios. (The reported values in this plan are in 2008 dollars ["2008$"].)

- Calculates environmental impacts of the plan, using externality values and forecasted emission permit prices.

Strategist is useful as a planning tool in two ways. First, given a set of assumptions about the forecasted demand for electricity and the resources available to meet that demand, Strategist will optimize the operation of existing resources and add new resources to develop the expansion plan with the lowest PVRR possible.

We also use Strategist as a tool to determine the PVRRs of alternative cases. In this case, Strategist is "forced" to accept a particular resource or an entire expansion plan, and the resulting PVRRs can be compared to analyze the effects of different resource choices.

The Strategist model also has some limitations. It is not a chronological dispatch model; that is, it does not simulate the operation of the system from hour to hour. The model is not able to simulate the ramp rate of units and other order-dependent variables that may affect the operation of the system. Instead, Strategist simulates system dispatch for each hour independently of what occurs before or after that hour.

We have used the Strategist model to perform analyses presented in many other dockets, including: 2007 Resource Plan (Docket E002/RP-07-1752); 2004 Resource Plan (Docket No. E002/RP-04-1752); Certificate of Need to Establish an Independent Spent Fuel Storage Installation at the Monticello Generating Plan (Docket E-002/CN-05-123); Emissions Reduction Proposal (Docket No. E002/M-02-633); 2001 All-Source Bid process (Docket No. E002/M-01-1618); 2002 Minnesota Resource Plan filing (Docket No. E002/RP-02-2065); and Blue Lake Certificate of Need filing (Docket No. E002/CN-04-76).

6.4.2 Base Case Assumptions

Since our 2007 Resource Plan was filed December 14, 2007, all Strategist inputs used in the analyses in this Application are the same as the inputs used in the Resource Plan. Thus, the forecast, legislative compliance with the RES and DSM legislation, individual plant information, externalities, fuel forecasts, etc. are all the same for this analysis as submitted in the 2007 Resource Plan.

6.4.2.1. Load Forecast

For this Certificate of Need Application, we used the same forecast that was filed in our 2007 Resource Plan on December 14, 2007. The forecast was developed in November of 2007 and reflects the most recent data available. As with previous resource plan modeling, the median or 50 percent probability forecast for energy, and the 90 percent probability for peak demand were used. The 90 percent probability forecast of peak demand was used to ensure that we have sufficient generation capacity to meet energy demand under most plausible circumstances.

6.4.2.2 Existing Fleet

Our entire generation fleet is modeled in Strategist. Inputs for each unit include: maximum dependable capacity, firm capacity (URGE), heat rate profiles, emission profiles, maintenance schedules, forced outage rates, fuel cost, variable O&M, and fixed O&M.

We recently completed a comprehensive review of Strategist inputs in preparation for the 2007 Resource Plan. The input review included changes to heat rates, emission rates, O&M costs, capacity ratings, and outage schedules. The changes ensure that Strategist is producing the most accurate forecast of system performance possible.

6.4.2.3 Renewables

Wind resources are modeled using representative hourly generation profiles. The nameplate capacity is multiplied by the hourly profile to estimate the unit's generation. This enables Strategist to simulate the

variability of wind and to predict the dispatch of thermal units needed to support these resources.

The Strategist inputs have been updated to reflect compliance with Minnesota's new RES. Instead of modeling the necessary requirements coming on-line only in the year they are needed, we assumed the addition of 200 MW of wind generation is added each year. We also reviewed and updated our cost assumptions for future wind energy.

Biomass plants are modeled much like other thermal plants and are dispatched on economic merit. Hydro power is modeled either as run-of-river where energy is provided at a constant rate, or as a dispatchable resource for hydro resources with pooling capabilities

6.4.2.4 Emissions

Externalities are modeled in accordance with the Commission's Order Establishing Environmental Cost Values in Docket No E-999/CI-93-583 for PM10, CO, and Pb. However, we replaced the Commission's externality value for NOx with a forecast of permit allocations and prices under the Clean Air Interstate Rule (CAIR). CAIR permit allocations and prices are also modeled for SOx and Mercury. The Commission's externality value for CO_2 was replaced with a higher value to reflect our expectations regarding the costs of future carbon regulations. Table 6-5 contains the emission costs as modeled and source.

Table 6-5:
Emission Assumptions Modeled

Effluent	
SO_2	$776.54/ton based on the current cost of permits under title IV of the Clean Air Act. This value increases significantly in 2010 with the implementation of the Clean Air Interstate Rule (CAIR)
NOx	$591.54/ton based on the current cost of permits under title IV of the Clean Air Act. This value increases significantly in 2009 with the implementation of the Clean Air Interstate Rule (CAIR)
Mercury	$18,432/ton starting in 2010 with the implementation of the Clean Air Mercury Rule (CAMR)
CO_2	$20/ton starting in 2010. This value is meant to be an estimate of the costs from future carbon regulation.

PM10	$7,094-$923/ton depending on location, based on externality values established by the Minnesota Public Utilities Commission.
CO	$2.17-$0.40/ton depending on location, based on externality values established by the Minnesota Public Utilities Commission.
Pb	$2.17-$0.40/ton depending on location, based on externality values established by the Minnesota Public Utilities Commission.

6.5 Description of Modeling Scenarios

The Monticello project was first compared against the selected alternatives using the 'base case' assumptions in Strategist. These assumptions included the reference case expansion plan from the 2007 IRP, the median fuel forecasts, the 1.1 percent DSM goal and the 30 percent RES, $20/ton CO_2 hedge value, and no externalities.

Under the base case assumption the Monticello project was estimated to be the least-cost option. To test the robustness of this result, numerous assumptions were changed and the model rerun. Under all sensitivities the Monticello power uprate project was determined to be the least-cost resource. The sensitivities tested were:

- Load Growth
- Fuel Price
- Externality Costs
- Carbon Regulation Costs
- MISO Market Interactions
- Capital Cost Escalations
- Power Uprate Project Cost (plus $29 million)

6.5.1 Description of Alternatives Studied

6.5.1.1 Monticello Power Uprate Project

The Monticello power uprate project is described in detail in Chapter 3. In summary the project will increase the capacity of the Monticello nuclear facility by approximately 71 MW through enhanced steam production. The project will be implemented in two phases during

the scheduled refueling outages in 2009 and 2011. The cost of the project includes $104 million in capital power uprate capital investments.

6.5.1.2 Hypothetical 71 MW Biomass Plant

A 71 MW base load type biomass plant was determined to be a reasonable alternative to the Monticello project. Such a plant will have roughly the same capacity and energy characteristics, but lower expectations for reliability and availability due to technology and fuel supply considerations. The capital costs for a new biomass plant are expected to be similar to other base load type steam plants. This analysis assumed that a plant commissioned in 2011 would cost $3,182/kW or $223 million. The fuel costs and operating characteristics were based on our existing plants and fuel forecasts.

6.5.1.3 Hypothetical 71 MW Coal PPA

The cost and availability of a 71 MW long-term coal-based PPA is highly speculative. This scenario assumed a capacity charge equivalent to the levelized revenue requirements of a new plant and energy charges equivalent to the cost of fuel at a 10 mmBtu/MWh heat rate plus a small variable O&M costs. The contract is assumed to deliver 71 MW continuously for a 20-year period. It is expected that a coal-based contract would be structured such that responsibility for the associated emissions would be assigned to the buyer. The emission rates for the hypothetical coal PPA are based on typical emission rates for our existing coal units.

6.5.1.4 Unconstrained

The "unconstrained alternative" is not a specific resource. In this scenario, the Strategist model is allowed to select the most cost-effective combination of resources from the available generic resources including coal, natural gas combined cycle, and natural gas simple cycle resources. In this analysis, the capacity need was filled by new additions of natural gas CT and the energy needs were filled from new and existing resources.

6.6 Economic Comparison of Strategist Alternatives

Table 6-6 below presents a comparison of the differences in the present value of revenue requirements (PVRR) for the Monticello upgrade project and the selected alternatives under the base case assumptions.

Table 6-6
Present Value of Revenue Requirements
Base Case Assumptions ($ millions)

	Monticello Uprate Project	71MW Coal PPA	71MW Biomass	Unconstrained
PVRR	**$61,674**	**$61,947**	**$62,188**	**$61,842**
PVRR difference from Monticello Project	**-**	**($273)**	**($514)**	**($169)**

In order to determine how changes in our assumptions impact the costs or characteristics of different resource plans, we examine our plans under a number of scenarios. If a least cost plan is extremely sensitive to changes in assumptions, it is not a robust course of action for the Company to pursue. Instead, we may propose an expansion plan that is less sensitive to assumption changes but slightly more costly in the baseline scenario. For this resource plan we tested the following scenarios.

- Load – The base forecast (unadjusted for DSM) has an average energy growth rate of 1.14 percent. The energy growth rate was adjusted down to average 1 percent and was also adjusted up to average 1.3 percent.

- Fuel Cost – The cost of natural gas, coal, and nuclear fuel were all independently adjusted up and down by 20 percent.

- Externalities – The Commission's low and high externality values were added to test the societal impacts of each expansion plan. However in place of the Commission's values for NOx

the forecasted CAIR permit price was used and the Company's baseline CO_2 hedge value of $20/ton was used in place of the Commission's CO_2 value.

- CO_2 Values – The CO_2 hedge values were varied down to $9/ton and up to $40/ton.

- MISO – Due to the unpredictability of future market conditions, we model the Xcel Energy system as a stand-alone system without additional purchases and sales from the MISO day-two market. In our sensitivity analysis Strategist's Network Economy Interchange (NEI) submodule was activated to simulate how the system might interact with the rest of MISO. However, this sensitivity requires highly speculative assumptions about supply and demand conditions in the rest of the market. The Company recommends that these results should be viewed as an estimate of one possible outcome, but not a precise prediction of what will occur in the future.

- Capital Cost Escalation – The base assumption in Strategist is that the cost of capital projects will increase at 1.88 percent. 3 percent and 5 percent cost escalation scenarios were also run to evaluate expansion plan sensitivity to escalation assumptions.

- Project Cost – The base case assumption for the Monticello uprate project is $104 million. An additional $29 million was added to the base cost to test the cost effectiveness of the project in the instance where additional capital expenditures are required to add a steam dryer to the project.

Table 6-7 presents the results of the sensitivities analysis. The leftmost column lists the PVRR result for the Monticello uprate project. The remaining columns list the differences from the Monticello project for each of the selected alternatives.

Table 6-7
Sensitivity Analysis

	Monticello Uprate Project	71 MW Coal PPA	71 MW Biomass	Unconstrained (Natural Gas CT)
	PVRR	PVRR Differences From the Monticello Uprate Project		
Base Case	$61,674	$(273)	$(514)	$(169)
Low Load	$60,448	$(273)	$(514)	$(155)
High Load	$63,186	$(273)	$(514)	$(188)
Coal+20 percent	$62,598	$(295)	$(514)	$(174)
Gas+20 percent	$64,336	$(271)	$(516)	$(244)
Nuclear+20 percent	$62,026	$(261)	$(502)	$(157)
Coal-20 percent	$60,736	$(251)	$(513)	$(165)
Gas-20 percent	$59,785	$(275)	$(511)	$(112)
Nuclear-20 percent	$61,392	$(284)	$(525)	$(180)
Low Externalities	$61,814	$(273)	$(515)	$(170)
High Externalities	$61,878	$(274)	$(515)	$(171)
CO2 $9/ton	$57,221	$(198)	$(362)	$(130)
CO2 $20/ton	$69,745	$(408)	$(790)	$(267)
MISO On	$61,556	$(273)	$(513)	$(139)
Capital Cost Escl. 3 percent	$63,103	$(272)	$(518)	$(170)
Capital Cost Escl 5 percent	$66,432	$(324)	$(527)	$(172)
Monticello Project Cost +$29million	$61,715	$(232)	$(473)	$(128)

The sensitivity analysis shows that the Monticello uprate is the least-cost alternative under a wide spectrum of modeling assumptions. Even with a 20 percent reduction in the base assumption for natural gas prices, the project still shows a PVRR savings of $112 million. In

the event that we would need to incur the additional $29 million for the steam dryer, the Monticello uprate project is still cost effective with an estimated $80 million net benefit.

6.7 Rate Impact

The base case PVRR savings for the Monticello uprate project is $169 million in comparison to the next lowest-cost alternative, which was the addition of a natural gas CT from the unconstrained scenario. The "unconstrained" scenario fills the capacity need with combustion turbine capacity and fills the energy from existing resources, which translates to a modest impact on rates. For the period 2008-2030, the average annual cost savings of the uprate is $25 million. During this same period the average annual sales are forecasted to be 59,900 GWh. The result is an average decrease of about $0.00041/kWh or 0.36 percent.

Because the PVRR differences for the Coal PPA and Biomass alternatives were even higher, the average rate impact would be even larger for the Monticello power uprate in comparison to those alternatives.

6.8 Environmental Comparison of Alternatives

Table 6-8 presents a comparison of the total system emissions for each alternative evaluated in this filing. Emission totals were calculated summing the forecasted emissions from our entire existing and planned generation fleet over the study period 2008 to 2030. The table compares differences between the total emissions for the preferred plan and each of the alternatives considered by setting the Monticello project as the baseline (in other words "0") and by showing how much higher or lower other alternatives are.

Table 6-8
Total System Emissions for Each Alternative

2008 – 2030 Emissions Differences	NOx Tons	PM10 Tons	CO_2 Tons	SO_2 Tons	VOC Tons	CO Tons
Monticello Uprate Project	0	0	0	0	0	0
71 MW Coal PPA	9,121	1,199	12,247,950	15,209	215	1,795
71 MW Biomass	40,078	1,802	25,090,410	8,264	317	7,128
"Unconstrained" Natural Gas Combustion Turbine	3,871	572	6,376,480	4,326	142	998

The Monticello power uprate project is projected to result in significantly lower system emissions than all the alternatives evaluated.

6.9 Alternatives Evaluation Summary

6.9.1 Monticello Power Uprate is the Best Option

We evaluated an exhaustive list of alternatives in selecting the Monticello power uprate project. First, we qualitatively screened a wide range of approaches and technologies to identify potential viable resources for meeting our resource needs. Next, for the resource alternatives that were found to be feasible, we conducted a quantitative analysis of the economic and environmental factors associated with each resource. We also allowed Strategist to pick the best generic resource based on the cost of capacity and energy. The Monticello project performed best on both the economic and environmental analysis. We are pleased to have identified a resource that meets our needs, minimizes the rate impact on customers and furthers the environmental and policy goals of the Company and the State.

7 Project Benefits Society

The Monticello project benefits society by meeting the overall state energy needs in an economically and environmentally responsible manner, thereby supporting future development in Minnesota and the region.

A Certificate of Need must be granted to an applicant upon determining that four principal criteria are met (Minnesota Rules 7849.0120). This section addresses the third criterion (Subpart C) that:

"by a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a matter compatible with protecting the natural and socioeconomic environments, including human health."

7.1 Society Benefits from Reliable, Low Cost, and Environmentally Benign Electricity Sources

Minnesota law establishes parameters to ensure that utilities select and implement resources that provide reliable energy at reasonable prices and with minimal impact on the environment. Our peak demand and energy requirements are growing at an average 1.2 percent and 1.1 percent, respectively per year.[20] We have a statutory obligation under Minnesota Statute § 216B.04 to plan our system to reliably serve our customers.

A low-cost, reliable energy supply is an economic driver to our customers as well as state and regional economies. Our diverse energy portfolio provides customers with a reliable and economic electrical energy supply. The Monticello project will complement our electric generation resources by providing capacity and energy 24 hours per day 7 days per week and utilizes existing facilities to provide reliable, low cost carbon-free energy to meet our customers' everyday energy needs in the most environmentally sound manner.

[20] These estimates are based on 50 percentile energy forecast and 90 percentile net demand forecast.

We have added base load generation in smaller increments over the years in the form of conservation and purchased power from renewable energy projects. We will be adding significant amounts of additional wind resources to our system due to the RES legislation. The addition of more base load nuclear energy to our existing nuclear and coal base load generation helps further diversify our generation mix, which can help mitigate risk.

7.2 Provides Value to Ratepayers

The Monticello plant is the most cost-effective alternative to providing the additional capacity and energy our customers need. The project further diversifies our generation portfolio and provides efficiencies by increasing the output from an existing generation facility. The use of an existing plant also more fully utilizes the existing transmission infrastructure. The Monticello project provides our customers with low-cost, carbon free energy and capacity round-the-clock. The high availability of the plant helps offset the intermittency of the significant amount of new wind resource that will be added to our system by replacing the use of some existing natural gas fired generation. This frees up the natural gas generation to be used in conjunction with the intermittency of the wind. The project also provides a hedge against additional exposure to natural gas fuel costs and future environmental regulations. Considered together, the low-cost carbon free resource provides great value – economic and environmental – to ratepayers.

7.3 Use of Existing Infrastructure

The Monticello plant is an existing generating facility and the changes necessary to achieve the additional 71 MW of output will primarily take place within the confines of the existing buildings. The site footprint will not be expanded and no greenfields will be affected by the power uprate. We will not need to construct or modify any building footprint, access roads, parking areas, or lay down areas to support the project. To assure reliability of the onsite auxiliary electrical distribution system, a new 13.8 KV bus and new 1R and 2R transformers and distribution systems will be installed.

The project will utilize the existing transmission facilities to transport electricity from the plant to the electrical grid. It is not known at this

time if any transmission enhancement may be necessary and if so what they are. The results of a feasibility study indicate that transmission system improvements may be required to support the uprate project, but the potential modifications are dependent upon which generation projects (and corresponding transmission improvements) listed in the MISO interconnection queue ahead of the Monticello project are constructed. Final determination of the necessary transmission system changes to support the increased generation at Monticello will be addressed in the appropriate MISO studies.

7.4 Lower Emissions

Monticello does not emit significant levels of any of the criteria pollutants or green house gases that are emitted from coal or other fossil fuel burning plants. The Monticello project will result in over 6.2 million less tons of carbon being emitted to the atmosphere as compare to the next "best" alternative - a natural gas CT.

7.5 Health and Safety

The uprate will not result in on-site or off-site radiological dose levels above the safe thresholds established by the NRC and in the Technical Specifications for Monticello. The uprate will not introduce any new or different radiological release pathways. The uprate will increase the number of fuel assemblies to be handled at each refueling (from 150 to on average 173 per refueling), but this change does not increase the probability of an operator error or equipment malfunction that would result in an uncontrolled radioactive release.

Traffic safety will not be degraded because the uprate will not result in a long-term change to the routes, number of trips, types of vehicles, or speed compared to current conditions. Any changes affecting traffic will be temporary in nature to accommodate delivery of equipment for the project.

7.6 Jobs

The Monticello project will employ a number of construction workers over the project construction period. These high-skilled, high-paying

positions will add payroll dollars into the rural, local Monticello economy. The uprate project will ensure the continued employment of the highly skilled and dedicated work force. This work force not only benefits the Monticello plant but the entire community as active, involved, tax paying citizens participating and contributing to the greater social fabric of the community.

7.7 Supports Future Economic Development

Historically, we have maintained low electric rates relative to utilities in other regions of the United States. As a result, Minnesota and the region have been able to attract industrial concerns and maintain steady economic growth. Our Monticello uprate will allow us to continue to reliably serve our customers' energy needs while maintaining favorable rates to support future economic development in Minnesota and the surrounding states. The Monticello project was the lowest-cost alternative – even under a wide variety of sensitivities were considered. Investing in additional assets at the Monticello plant will increase the asset value of Monticello and will also provide additional property tax revenues.

7.8 Provides Tax Benefits

It is anticipated that the Monticello power uprate project will provide significant tax benefits - local, state and federal. It is estimated that the local property tax benefits due to the project will results in an additional $1.2 million annually and will result in a one-time payment of approximately $4.5 million in Minnesota state sales taxes for equipment. In addition, the project will result in increased state and federal income taxes being paid by the Company of an estimated $30.5 million over the life of the project.

8 Project Compliance

The Monticello power uprate project serves the overall state energy needs, fosters state energy policy and complies with all applicable rules and regulations.

A Certificate of Need must be granted to an applicant upon determining that four principal criteria are met (Minn. R. 7849.0120). This section addresses the fourth criterion (Subpart D) in that:

"the record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments."

8.1 Project is Consistent with Minnesota Energy Policy

8.1.1 Legislative Preference

The Minnesota legislature has determined that:

"The following energy sources for generating electric power distributed in the state, listed in their descending order of preference, based on minimizing long-term negative environmental, social, and economic burdens imposed by the specific energy sources are:

1. *wind and solar;*
2. *biomass and low-head or refurbished hydropower,*
3. *decomposition gases produced by solid waste management facilities, natural gas-fired cogeneration, and waste materials or byproducts combined with natural gas;*
4. *natural gas, hydropower that is not low-head or refurbished hydropower, and solid waste as a direct fuel or refuse-derived fuel; and*
5. *coal and nuclear power."*[21]

[21] Minn. Stat. §216C.051, subd. 7(c) and (d).

Xcel Energy supports an energy policy that balances the impact of energy use and production on the environment, with the costs and reliability of various resource options. We believe a diverse portfolio that includes reliance on renewable resources and demand-side management best meets this objective. The selection of the Monticello project over the alternatives considered is consistent with the State's Energy Policy priorities. First, we reduced our forecast 1.1 percent starting in 2010 to reflect our commitment to the DSM requirements of the Next Generation Energy Act of 2007. Then, compliance with the nation's most aggressive renewable energy standard was assumed. This amounted to adding 200 MW of wind to our system per year. The project was then compared to hypothetical biomass, natural gas, and coal generation. The uprate proved to be the most economical project, produces the greatest amount of carbon reduction of the alternatives, and has the least land impacts. The project is a modification to an existing site and the use of an existing site to generate the non-emission incremental energy minimizes "*negative environmental, social and economic burdens…"* when compared to the fossil-fueled alternatives considered.

The 2007 Legislature also declared the state's goal to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050. Minn. Stat. § 216H.02, subd. 1. The modeling supporting our 2007 Resource Plan, which includes the uprate to the Monticello plant, suggests that implementation of the Resource Plan will ensure our compliance with the state's carbon-reduction milestones, providing a 22 percent (6-million ton) reduction in CO_2 emissions from 2005 levels by 2020.

8.1.2 Department of Commerce Policy

The Monticello uprate project serves the State Energy Policy goals as stated in the Minnesota Department of Commerce publication *Energy Policy & Conservation Report 2004*. The four guiding principles of Minnesota energy policy are to ensure that:

1. *Minnesota has a reliable energy-provision system into the future;*
2. *the State's energy system meets Minnesota's economic needs;*

3. *Minnesota's energy cost remains low, compared to the rest of the nation; and*
4. *the environmental impacts of energy produced and consumed in the state are reduced.*

The goal of these guiding principles is to maintain Minnesota's current reliable, low-cost energy in order to promote job growth and economic development, while lowering the environmental impacts of the production, delivery and use of that energy."

The *Energy Policy & Conservation Report 2004* lays out seven energy policy strategies to achieve those guiding principles:

1. Continue the operation of facilities that provide safe, reliable power, low-cost power and do not emit air pollution.

2. Encourage coal-fired power generation facilities to convert to less polluting fuels or to install state-of-the-art emissions control technologies.

3. Encourage the generation of reasonably priced, environmentally superior electricity from low-polluting or renewable fuels.

4. Enhance the state's energy delivery infrastructure to assure reliability and provide access for electricity from low cost and/or environmentally superior resources.

5. Support research, development and deployment of new, environmentally superior energy technologies.

6. Support the state's conservation programs.

7. Reduce regulatory and government barriers.

The uprate project clearly addresses all four of the guiding principles by offering a low-cost, environmentally benign generation option to meet our customer's needs. The proposal also directly addresses Strategy #1 – which is to "Continue the operation of facilities that provide safe, reliable power, low-cost power and do not emit air pollution". The Project directly addresses #4 by adding a highly reliable, low-cost and environmentally-superior resource. The passage of the 2007 DSM and

RES legislation are also incorporated into our analysis through the explicit assumption that the DSM goals will be achieved and the RES will be met – which directly supports Strategies # 3 and #6.

8.1.3 Non-Proliferation Policy

The Monticello uprate project will take full advantage of existing infrastructure. The uprate will take place at an existing generation facility within existing buildings and it will use existing high-voltage electric transmission facilities to transport the energy generated. Only minimal activity of installing a new 13.8 KV bus and 1R and 2R transformers will take place outside the existing facility. After completion, the power uprate project will be unnoticeable.

The use of existing transmission facilities is consistent with the State of Minnesota's commitment to non-proliferation of transmission corridors.[22] Two generation interconnection filings have been made at the MISO for the additional MW expected in 2009 and 2011. Any transmission upgrade identified for the additional 71 MW should be minimal and will be addressed after the completion of the appropriate MISO studies.

8.2 The Project Complies with Federal and State Environmental Regulations

The Monticello power uprate project meets or exceeds the requirements of all applicable federal and state environmental laws and regulations. The approval of three regulatory permits is necessary to implement the uprate: the Certificate of Need and Site Permit from the Minnesota PUC, and the Operating License Amendment from the NRC. Plant operation after the power uprate will be within the operating limits of all other existing State and Federal permits.

8.3 Carbon Risk Analysis Compliance

Order Point 16 of the Commission's Order dated July 28, 2006 from our 2004 Resource Plan (Docket No. E002/RP-04-1752), states:

[22] *People for Environmental Enlightenment and Responsibility (PEER) v. Minnesota Environmental Quality Council*, 266 N.W. 2d 858 (Minn. 1978)

Xcel shall discuss carbon risk analysis strategies in the November 1, 2006 base load certificate of need filing required in paragraph 10, in its next resource plan, in future certificate of need filings, and in other proceedings involving the acquisition of generation resources.

There is significant concern over climate change policy - internationally, nationally and at the state level. The contribution of carbon released during the combustion of fossil fuels for electric generation is often at the forefront of that discussion. There is a significant amount of discussion is the development of a market for trading carbon credits. This creates a potential regulatory and cost risk when proposing to construct a fossil fuel burning power plant that emits carbon. Monticello does not produce carbon. The power uprate is carbon neutral on its own. Integrated into our resource mix, the addition of the Monticello project will reduce carbon by eliminating the need to build a new gas-fired CT and by reducing the use from existing fossil fuel plants. Nonetheless, we are providing a carbon risk analysis in compliance with Order Point 16 of our 2004 Resource Plan.

8.3.1 CO_2 Analysis

The issue of global climate change is in the forefront of public policy debates in the United States. Today, Congress, state legislatures and policy makers across the country and around the world are gradually identifying and adopting policies to address greenhouse gas ("GHG") emissions. In Minnesota, Governor Pawlenty and the Legislature have made global climate change a top priority, most notably through the Next Generation Energy Act.

Global climate change and the likelihood of future GHG regulation underlie the approach proposed in this Resource Plan. Xcel Energy believes that by the time we file our next Resource Plan, the nation will be subject to regulations designed to reduce GHG emissions, and that those regulations will have a significant impact on the Company's operations.

Global climate change is a complex issue that affects the Company in many ways. This discussion touches on the major aspects of global climate change as a resource planning factor, beginning with federal, state and regional policy initiatives, continuing with the impacts of

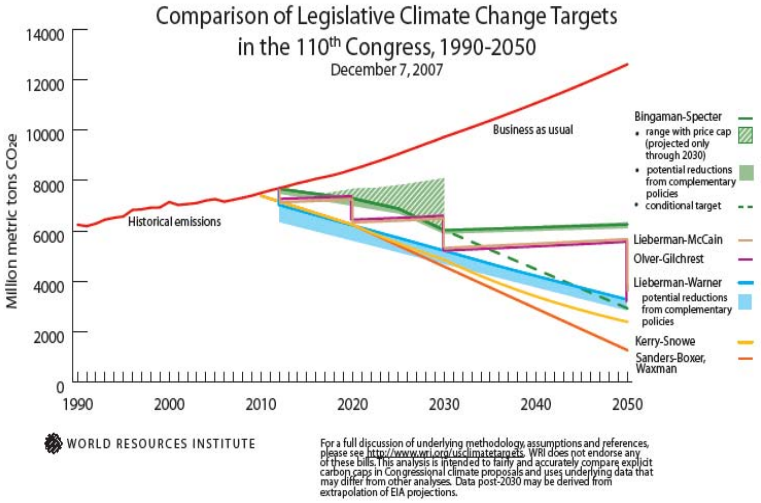
climate policy on our business landscape including the pricing of CO_2, and concluding with the implications for this Resource Plan.

8.3.1.1 Federal Legislative Proposals

The current Congress is considering a number of bills that address global climate change. These bills include legislation sponsored by Senator Bingaman, Senator Lieberman, Senator Boxer, and Senator Kerry, among others. The bills usually have some bi-partisan support. Although these bills vary in structure and format, most of them share several common traits. On December 5, 2007, the Senate Environment and Public Works Committee passed the American Climate Security Act sponsored by Senator Lieberman and Senator Warner. Like the other climate policy bills under consideration, the Lieberman-Warner bill would impose CO_2 emission limits on the entire economy and target some level of emission reductions by 2020. The bills all target much more aggressive reductions by 2050. They would use a "cap and trade" policy structure – placing an overall limit on GHG emissions across the economy and allowing sources to trade emission allowances with each other to meet their emission targets. However similar, the bills vary dramatically in their particulars, including whether they incorporate "safety valves" (i.e. maximum carbon prices) and how they allocate emissions.[23] A comparison of the reductions proposed by the bills is shown in Figure 8-1.

[23] Xcel Energy supports a national Clean Energy Portfolio Standard, which would use a mechanism similar to a renewable portfolio standard to promote the use of clean technology and limit GHG emissions from the utility industry.

Figure 8-1
GHG Emission Trajectories Under Proposed Federal Legislation



Many of these programs are generally designed to reduce CO_2 emissions to levels that, according to many computer models, would put the U.S. share of global emissions on a trajectory to help stabilize atmospheric CO_2 concentrations at 450 to 550 parts per million, or roughly twice pre-industrial levels.

Most recently, on December 6, 2007, the House passed legislation that in addition to increasing fuel economy standards for cars and light trucks sold in the United States, the legislation requires utilities to produce 15 percent of electricity from renewable sources by 2020.

8.3.1.2 State and Local Climate Policies

The states are not waiting for Congress to act. States throughout the country are proposing CO_2 emission reduction programs and using other policy mechanisms to address GHG emissions. In Minnesota, the Legislature and Governor Tim Pawlenty have already passed the most stringent renewable energy standard in the nation and both aggressive energy efficiency requirements and statewide GHG emission reduction goals through the Next Generation Energy Act. This also requires a plan for regulatory action and establishes a formal stakeholder process

(the Minnesota Climate Change Advisory Group) to make recommendations on future policies related to climate change. It further reinforces the regulatory process that requires CO_2 valuation in resource planning. Prospective state and federal climate policies have profound implications for the Company's resource planning.

8.3.1.3 Impacts of Climate Policy on the Energy Industry

To meet the challenge of global climate change and prospective regulation while continuing to provide reasonably priced, reliable energy service to its customers, Xcel Energy and the industry will need to undertake significant changes.

First, because of the long planning periods that must be employed in the utility industry, we need to act early and make decisions about our resources despite the fact that climate change regulation has not yet been implemented.

Second, there is today no single "solution" that will allow the Company to achieve significant GHG reductions while meeting its obligation to serve its customers. The Company must rely on a diverse portfolio of clean resources available today to bridge the gap to a clean energy future tomorrow. Integrated transmission planning will be a critical component of this strategy because it can link utility customers to the clean energy supplies (e.g. renewable energy resources and areas with good geologic sequestration opportunities).

Third, as these technologies evolve, we must have the flexibility to adjust our strategies. It is highly likely that investment in research, development and deployment will need to be reconsidered in order to meet the challenges of the new energy landscape. Today's programs may be supplanted by new approaches to innovative technology in the regulated utility context.

8.3.1.4 Carbon Dioxide Pricing

There are many GHGs, but CO_2 is the most important for policy and planning purposes. CO_2 pricing provides a suitable representation of regulatory risk and climate policy direction. The two main types of GHG emission reduction policy proposals are "cap and trade" programs

that require reduced levels of emissions in conjunction with tradable emissions allowances, and "carbon tax" programs that levy a fee on GHG emissions. Both impose a price for CO_2 emissions to fossil generators in the electric power sector. A CO_2 price could come from the market for emissions reduction under a cap and trade program, or could come directly from a carbon tax. In either case, the CO_2 price imposes a new operating cost to new and existing fossil power plants.

To develop our CO_2 emissions price scenarios, we have researched recent, publicly available analyses of mandatory greenhouse gas policies. Numerous analyses of U.S. GHG emission reduction policies have been performed and we have selected a set of analyses that we believe represent the range of current public thought about U.S. CO_2 pricing. In addition to these analytic results, we have also reviewed CO_2 price curves based on the statutory price ceiling or "safety valve" prices from three proposed federal bills. We have also included the carbon proxy cost of $9/ton used in other dockets. On December 7, 2007, in Docket No. E-999/CI-07-1199, the Commission adopted new interim values for CO_2 to be used in resource planning for 2008, a cost estimate range from $4 to $30 per ton. An Order has not yet been issued in this case.

Table 8-1
Levelized Carbon Dioxide Prices From Various Sources

Scenario Name	Note	Levelized 2010-2030 $/metric ton CO2e
Bingaman '06 (EIA)	EIA analysis from January 2007 of Bingaman 2006 cap proposal, "Phased Auction" or main case. Bingaman's policy has since been updated	$9.16
Bingaman '06 (Safety Valve)	Carbon price set at statutory price ceiling (not a modeled result) from Bingaman 2006 cap proposal	$10.15
Bingaman '05 (Safety Valve)	Carbon price set at statutory price ceiling (not a modeled result) from Bingaman/NCEP 2005 cap proposal	$10.42
2003 PSCo Resource Plan Proxy Cost	2004 Settlement Agreement between stakeholders related to Comanche 3 coal plant	$12.01
Bingaman '07 (NCEP)	NCEP analysis from July 2007 of Bingaman 2007 cap proposal. Based on EIA "High Technology" case	$13.19
Lieberman '06 (EIA - Low Price)	EIA analysis from July 2007 of Lieberman-McCain S. 280 cap proposal, "Fixed 30 Percent" or high offsets case	$16.10
Lieberman '06 (US EPA - Low Price)	US EPA analysis from July 2007 of Lieberman-McCain S. 280 cap proposal, "Senate Scenario," ADAGE model	$16.24
Bingaman '07 (Safety Valve)	Carbon price set at statutory price ceiling (not a modeled result) from Bingaman 2007 cap proposal	$17.40
Lieberman '06 (US EPA - High Price)	US EPA analysis from July 2007 of Lieberman-McCain S. 280 cap proposal, "Senate Scenario," IGEM model	$22.99
MIT (Low Price)	MIT Analysis from April 2007 of a policy that includes a safety valve, titled "Core scenario: 287 bmt"	$23.72
Lieberman '06 (EIA - Medium Price)	EIA analysis from July 2007 of Lieberman-McCain S. 280 cap proposal, "S.280 Core" or medium offsets case	$25.19
Lieberman '06 (EIA - High Price)	EIA analysis from July 2007 of Lieberman-McCain S. 280 cap proposal, "No International" or low (domestic only) offsets case	$32.97
MIT (Medium Price)	MIT Analysis from April 2007 of a 1995 by 2020, 50% below 1990 by 2050 policy, titled "Core scenario: 203 bmt"	$54.79
MIT (High Price)	MIT Analysis from April 2007 of a 1990 by 2020, 80% below 1990 by 2050 policy, titled "Core scenario: 167 bmt"	$71.18

As demonstrated by the table above, there is a significant range of possible CO_2 values. Based on our research, we believe that the range of CO_2 price scenarios in the analyses shown above will encompass most likely GHG emission reduction policies. To better compare the CO_2 price curves from the analyses considered, we performed a simple levelization analysis. Levelization allows us to compare price curves from analyses and statutory "safety valve" prices with different starting years and escalation rates. To levelize the price curves, we calculated the net present value of each CO_2 price curve from 2010-2030 and then created a levelized series of annual prices from 2010 to 2030 with an equivalent net present value. We note that while these levelized values

are useful for comparison purposes, we used CO_2 price curves rather than levelized values in the actual Resource Plan modeling work. Table 8-2 below presents the levelized CO_2 price results used in our Plan. In light of the significant ongoing changes in the political climate regarding GHG emission regulation, we believe that the "Medium" scenario set forth below is the appropriate base case for modeling and analysis, and that the "Low" and "High" represent appropriate sensitivities.

Table 8-2
2007 CO_2 Price Scenarios

Scenario	2008 Price ($/short ton CO_2)	2030 Price ($/short ton CO_2)	2010 Price ($/metric ton CO_2)	2010-2030 Levelized Price (nominal $/metric ton CO_2)
Low	$9.00	$16.39	$11.02	$13.34
Medium	$20.00	$32.77	$22.05	$26.69
High	$40.00	$65.54	$44.09	$53.38

By including the prices above in our various planning scenarios, we have evaluated the costs of different carbon-regulatory scenarios and different resource mixes. Our Preferred Plan reduces our carbon footprint in excess of 20 percent over the planning period. By doing so, we will reduce our exposure to the costs of future carbon regulation. We believe this information provides an appropriate tool for considering future carbon regulation scenarios and attempts to incorporate the risk analysis required in the 2004 Resource Plan Order. Nonetheless, we believe the developments on CO_2 make our analysis an appropriate low, medium and high scenario and consider the needed resources to comply with the RES. Adding coal resources without sequestration would significantly add carbon and risk for our ratepayers.

8.4 Compliance and Policy Summary

The expansion of an existing low-cost generation facility benefits all. The design, construction and operation of Monticello will comply with all policies, rules and regulations of the State of Minnesota and the NRC. The Monticello power uprate will:

- Improve the reliability of the state's energy infrastructure;

- Contribute towards the legislature's 30 percent carbon reduction goal by 2025;
- Operate within the existing water appropriation, water discharge, air and other operating permits;
- Utilize an existing site; and
- Provide the generation capability to meet our project objectives using the most environmentally friendly and cost-efficient generation resources available; resulting in minimal cost impact to ratepayers as compared to the alternatives.